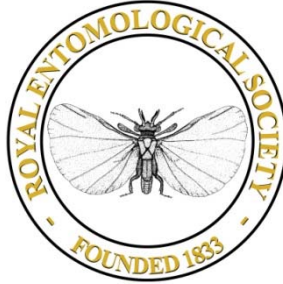


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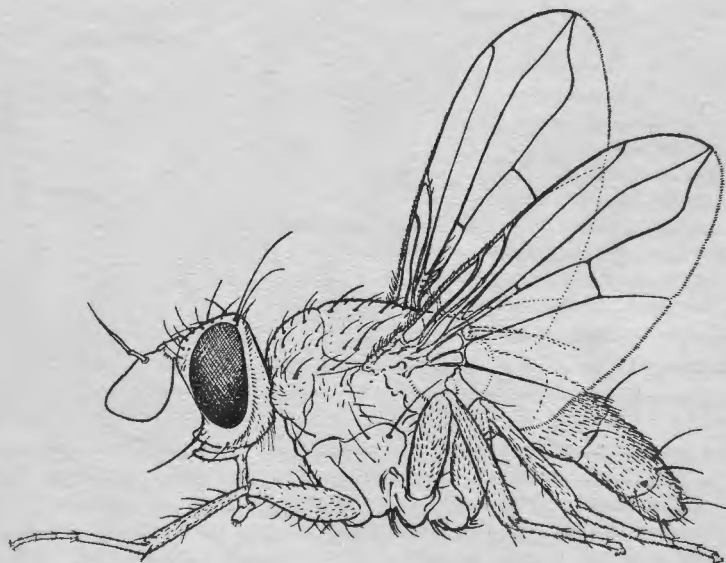
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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS



DIPTERA CYCLORRHAPHA
CALYPTRATA (I)
SECTION (a). TACHINIDAE AND CALLIPHORIDAE

By
F. I. VAN EMDEN

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HANDBOOKS FOR THE IDENTIFICATION OF BRITISH INSECTS

The aim of this series of publications is to provide illustrated keys to the whole of the British Insects (in so far as this is possible), in ten volumes, as follows :

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| „ 4. Collembola. | „ 12. Neuroptera. |
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Orthoptera. | „ 13. Mecoptera. |
| „ 6. Plecoptera. | „ 14. Trichoptera. |
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IX. Diptera : Nematocera and Brachycera.
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The Society is indebted to the Royal Society for a grant towards the cost of initiating this series of *Handbooks*.

A list of parts now available appears on the back cover.

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DIPTERA: CYCLORRHAPHA

CALYPTRATA

By F. I. VAN EMDEN

THE Calyptrata (Calypterata, Calyptrae), containing such groups as dung flies, cabbage flies, house flies, blue bottles, green bottles, warble flies and parasitic flies of caterpillars, etc., are a rather well-defined major group of Diptera, which can be recognised by the cleft on the dorso-exterior surface of the second antennal segment (fig. 1A, L, M; see *Handbooks*, 9 (1) : 39 and fig. 28), which in Acalyptrata is visible at the most as a fine suture-like line. The spiracles are situated in the ventral part of the tergites (fig. 1R, *sp*), whilst in Acalyptrata they lie in the membrane between tergites and ventrites (but there are exceptions from the general rule both in Acalyptrata and Calyptrata, where the tsetse flies of Africa and the Cordyluridae have the spiracles located in the membrane). The lower calyptra (fig. 1B and C, *l.c.*) is often large and prominent, and this prompted Robineau-Desvoidy (1830) to place the majority of the forms in a group "Calypterata." Large calyptrae, however, are also found in some Acalyptrates, and small or very small ones in many Anthomyiinae, etc., and especially Cordyluridae (fig. 1D, *l.c.*), all of which were excluded from his Calypterata by Robineau-Desvoidy. By their mouthparts, second antennal segment, etc., however, they appear closely related to Muscidae. The postalar callosity (or "posterior callus") is as a rule well marked (fig. 1E and G, *c*); the transverse "suture" dividing the thorax into an anterior (presutural) and a posterior (postsutural) part is often uninterrupted on median line (fig. 1G, *s*). *ph* and *prst ia* (fig. 1G) very often both present (in Acalyptrata never present at the same time).

The four families may be separated by the following key.¹

- 1 (4) Hypopleura in front of spiracles (*sp*) with a curved—concavity forward—row of setae (fig. 1E and F, *hs*)
- 2 (3) Postscutellum, a convex cushion-like fold without hairs and setae below the scutellum and above the metathoracic declivity (fig. 1E, *p*), well developed. If the inner margin of the lower calyptra diverges backwards from lateral margin of scutellum (fig. 1C), R_5 not wider at apex than $r-m$ is long (fig. 1H) TACHINIDAE, p. 7.

¹ The abbreviations in this and the other keys are those used by most Dipterists :

<i>acr</i> , acrostichal bristles (hairs).	<i>prst</i> , presutural.
<i>dc</i> , dorsocentral bristles.	R_5 , first posterior cell.
<i>h</i> , humeral cross-vein.	r_1 , first vein.
<i>ia</i> , intra-alar bristles.	r_{2+3} , second vein.
<i>m</i> , fourth vein.	r_{4+5} , third vein.
<i>m-m</i> , posterior cross-vein.	<i>r-m</i> , small cross-vein.
<i>npl</i> , notopleural setae.	<i>sa</i> , supra-alar bristle.
<i>ph</i> , posthumeral seta.	<i>sc</i> , auxiliary vein.
<i>post</i> , postsutural.	<i>Sc</i> , pterostigma.
<i>pra</i> , prealar bristle.	<i>stpl</i> , sternopleural bristles.
<i>prsc</i> , prescutellar.	

- 3 (2) Postscutellum absent (fig. 1F), indistinct or weakly developed: if rather well developed (some specimens of *Cinochira*), the whole inner margin of the lower calyptra diverging backward from lateral margin of scutellum (fig. 1C) and at the same time R_2 twice as wide at apex as at $r-m$ (fig. 1F)
- 4 (1) Hypopleura in front of spiracle without a curved row of setae (though sometimes with some irregularly arranged fine short hairs).
- 5 (6) Lower calyptra more or less conspicuous (fig. 1B and C), though often much less projecting than upper one; in these cases either the hind tibiae with distinct dorsal rows of decumbent black hairs (fig. 1K), which lie on two slight longitudinal ridges, or the occiput (fig. 1L, *ot*) with black hair
- 6 (5) Lower calyptra strongly reduced, not projecting and forming only a membranous fold (fig. 1D, *l.c.*). Hairs irregularly arranged on the evenly convex dorsal surface of the tibiae (fig. 1J). Occiput with more or less numerous whitish hairs.² Head always with broad frons and without cruciate interfrontal setae. Abdomen almost always with 5(6) exposed segments.

CALLIPHORIDAE, p. 96.

MUSCIDAE

CORDYLURIDAE

Morphology, etc., have been treated in the *Introduction to the Diptera* (Oldroyd, 1949), and the terms used in the present part are, moreover, explained by the figures. Not much need, therefore, be added. It must be stressed that all setae, etc., must be located carefully, since quite different groups will be arrived at, if a row of setae is found on the facial ridges (*fa*, fig. 1M) or on the parafacialia (*pfa*, separated from the former by the ptilinal suture, *pt*), or if a seta on the middle tibia (fig. 1N and o) is anteroventral (*av*) or anterodorsal (*ad*) in position (see below).

The *direction* in which a seta is inclined can be recognised even if the seta is lost, as the margin of its pore is more or less markedly raised on the side towards which the seta is directed.

Some additional characters not mentioned in the *Introduction* are used in the present paper, and a few remarks on other characters which obtain a

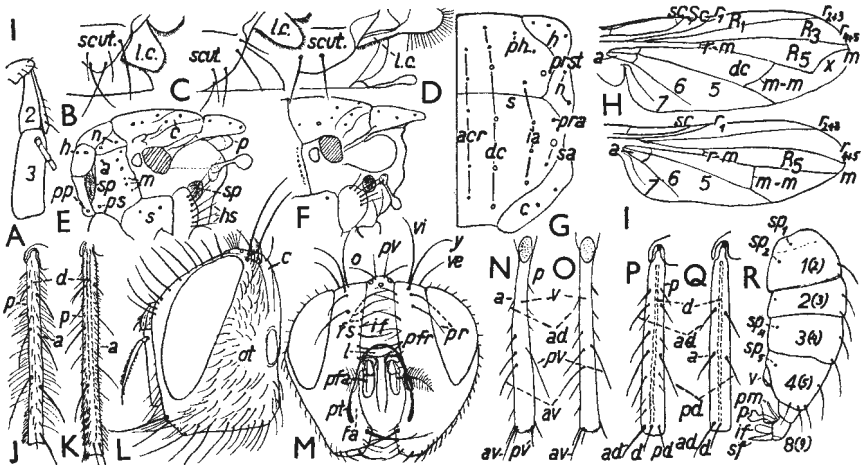


FIG. 1.

² teste Tiensuu.

special importance are desirable. On the jowls a hairy, slightly embossed and usually pollinose area extends forward from the hairy area of the occiput; it has been called "*occipital dilation*" by Mesnil. Where the row of setulae behind the eyes, the *occipital row*, runs downward and forward in a straight or slightly and evenly concave line (fig. 2κ) the occipital dilation is said to be absent, but where the occipital row is markedly bent forward, so that the setulose area forms a broad or narrow tongue on the jowls, the occipital dilation is well developed (fig. 2c, D and L, *o.d.*) The dorsal median part of the occiput is called *cerebrate*; it is defined by a pair of fine sutures, and is as a rule more shiny than the adjacent parts of the occiput and largely bare (fig. 1L, c). The setae of the frons (fig. 1M) consist, apart from the (inner *vi*, and outer *ve*) verticals, the diverging postverticals (*pv*), and the ocellars (*o*), of a paired *frontal row* of converging ("*inclinate*") *frontal setae* (*fs*) along the inner margin of the parafrontalia (*pfr*), which row may be continued on the upper part of the parafacialia (*pfa*) by one or more *descending frontals*, often a pair of *cruciate interfrontal setae* on the *interfrontalia* (*if*), the softish strip belonging to the ptilinum which is situated between the parafrontalia, a few (1-3) *reclinate* or *upper frontal setae* (fig. 2D, r) at the upper end of the frontal row, which may be absent, hardly defined or well defined and even somewhat isolated from this row, and which in some groups are bent outward and backward, in most female and some male Calyptrata two or a few (less often a whole row or only one) of *proclinate orbital setae* (*pr*) between the frontal row and the upper eye margin, and in some genera a single conspicuous *praevertical* (*y*) seta in front of the verticals, which is strongly bent outward and situated somewhat more outward than the reclinate setae. The width of the front including vertex at the narrowest part has been measured like the head width where it is compared with the latter. Similarly the (overall) length of the third antennal segment and the (dorsal = anterior) length of the second should be measured where the lengths of these segments are compared.

The setae of the *thorax* (*Introduction*, p. 13) are of special importance in this group, and it should be kept in mind that the reductions affect and sometimes eliminate the acrostichals (*acr*) and sometimes intra-alars (*ia*), whilst the dorsocentrals (*dc*) or some of them remain strong (fig. 1G). The pleural setae are shown in fig. 1E, where *h* means *humeral*s, *n* *notopleural*s, *pp* *propleural*, *ps* *prostigmatal*, *a* *anterior mesopleural*, *m* *mesopleural row*, *s* *sternopleural*s (*stpl*) and *hs* *hypopleural*s.

In describing the wing venation small letters are used in this part for designating veins and capital letters for cells, the letters being those used by Comstock and Needham. However, since the veins and cells of the posterior part of the wing (behind the main part of *m* and the cross-vein *m-m*) are subject to differing morphological interpretations and largely of a compound nature, the old-fashioned designations *fifth* (5), *sixth* (6) and *seventh* (7) veins, discal (*dc*) and *anal cells* (*a*) have been used as explained in fig. 1H and I. It is important to remember that wing venation is subject to some variation, e.g., R_5 can be closed by the *apical cross vein* (*x*) or even very shortly petiolate in forms with normally open R_5 . Thus I have seen an otherwise normal *Thelairia nigripes* with petiolate R_5 . Where the coloration of the halteres is mentioned it refers only to their knob.

For locating the *setae of the legs* the latter are imagined as extended side-

ward in a straight line at right angles with the body, so the four main directions dorsal (*d*), anterior (*a*), ventral (*v*) and posterior (*p*) are obtained. By combining two adjacent ones of these directions, e.g., antero-ventral (*av*), postero-dorsal (*pd*), etc., intermediate positions are described. The *d* surface of the tibiae will more easily be identified (especially when immature specimens have been killed and the legs have been twisted in drying) if the following facts are kept in mind. The basal (knee) end of the tibia projects on its *d* surface where the tendon of the extensor muscle is inserted: this projection is quite conspicuous under appropriate magnification (see fig. 1P and Q), and contrasts sharply with the emargination of the *v* surface (see fig. 1N and O). In most Calyptrata the *d* surface is, moreover, recognisable by a pair of very pronounced rows of decumbent short hairs (fig. 1K, P and Q), between which the surface is glabrous and as a rule shallowly grooved. Wherever setae of the tibiae are mentioned without the addition of the word "subbasal," "apical" or "praeapical" those on the intermediate part are meant.

The fused first and second abdominal tergites (fig. 1R) are in this paper counted as the first tergite (1), and the first ventrite, which is small but separate from the second, is called "ventro-basal scale" where it is necessary to refer to it; as in previous papers I use the terms "tergite" and "ventrite" exclusively for parts of the abdomen. Where discal or marginal setae of the tergites are mentioned without qualification, only the pair close to the dorsal median line, the "median discals" or "median marginals" are concerned, not any lateral or dorsolateral discals or marginals. The marginals are the setae close to the hind margin, and the discals are placed between the marginals and the fore margin. The *genital segments*, which are very frequently mentioned in Sarcophaginae, are in the male the somewhat hemispherical segment carrying the forceps (*second genital segment*, 2G) and the one preceding it (*first genital segment*, 1G), which consists in reality of two more or less fused segments (morphologically the seventh and eighth), in which the sixth may to some extent have been incorporated. In the female Sarcophaginae they are the fused sixth and seventh tergites, which form the apparent fifth.

For the male hypopygium (fig. 1R) the following simple terminology is used: *superior forceps* (*sf*) for the, often more or less fused, pair of appendages which lies ventrad of the membranous anal area, *inferior forceps* (*if*) for the pair of appendages which articulates in front of the outer basal end of the superior forceps. The intromittent organ is called the *penis* (*p*), and at its base two or less, frequently only one, pair of *parameres* (*pm*) are found. In resting position the genitalia are withdrawn into a pouch which is closed exteriorly and anteriorly by the fourth (really fifth) ventrite (*v*). The latter is usually more or less deeply bilobed or otherwise modified in connection with this function. The hypopygium of the Calyptrata has undergone clockwise rotation by 360°. This is not exteriorly visible but can be traced by anatomical facts, and it does not affect descriptive work. For the identification of species, the male genitalia are sometimes indispensable, and almost always very useful, and they should always be brought into an exerted position when freshly killed Calyptrata are mounted for the collection. This can easily be done with the aid of a needle, the apex of which has been bent to form a hook. It is, however, necessary to hold the genitalia in exerted position while the specimen dries. This can be done with pins on a plate

of cork or the like, or by inserting a small wedge-shaped piece of stiff paper. Where it is necessary to study the genitalia of dried specimens, it is as a rule better to avoid relaxing of the specimen, which—if water vapour is used—often destroys the pattern of the pollinosity, and instead to cut off the tip of the abdomen by a quick cut with a pair of sharp scissors in an oblique direction from the dorsal hind end towards the ventral front end of the abdomen. A vessel with alcohol of 40 per cent. must be kept underneath the specimen during the operation to receive the tip of the abdomen, which otherwise will often be lost. After having soaked for about 10 minutes in the alcohol the genitalia will be soft enough to be extracted.

In describing the pattern a *vitta* always refers to a longitudinal stripe and a *band* to a transverse one.

The measurements in mm. at the end of each description refer to the total length of the body, including the head but excluding antennae, wings, etc.,. Where good British series were available extreme measurements of these are given, but otherwise foreign material was included. These measurements can in any case not be more than an indication of the range of size, and it will in many cases not be difficult to find a smaller or larger specimen.

The *distribution*, as known to me at present, is normally given by a number of counties forming the angles of a polygon (densely stippled on map). Any county traversed by a line which is imagined through the most distant parts of two counties immediately following upon each other in the list is deemed to be included in the area. This does, however, not apply to Welsh counties when a line connecting two English counties runs through Wales without a Welsh county also being mentioned. Species are not necessarily available or have not been recorded from every single county included in such a polygon but from a reasonable number of counties (lightly stippled on map), so that the fly may be assumed to range over the whole area. In the case of species which have been found at not more than about five places the full list of localities is given; for other less widely distributed species the counties have simply been listed without the word "to" thus not forming a polygon. An exclamation mark (!) after a locality indicates a new record for the species.

For species which have been found more than a very few times the *seasonal occurrence* is represented in periods of 10 days, each month being divided into the beginning ("b" = 1st–10th), middle ("m" = 11th–20th) and end ("e" = 21st–31st). As far as successive periods are covered by published records or by data on material studied, they have been united into one period (e.g., e.v–m.viii), and this has also been done where one, or some *non-successive*, thirds of a month are not covered, as long as this gap does not occur between the end of May and beginning of July, when linking up of the periods might have obscured the beginning of a new generation. Correspondingly periods have been united more freely in early spring and in autumn, when gaps between generations can hardly occur. Where published sources or labels refer only to the month of capture, this has been given as far as it supplements available data.

Because of other duties I have not been able to work through all the British faunistic literature nor even a considerable material of unnamed British Calypttrata in the British Museum (Natural History). I am very grateful to my wife for having tested the keys against some of this material. The keys have also been used by Dr. C. H. Andrewes and Mr. E. C. M. d'Assis-



Distribution of *Macquartia praefica* Meigen. Counties not stippled : No credible records or specimens seen. Counties stippled lightly : Credible records or specimens seen. Counties stippled densely : Delimiting the proved distribution and therefore mentioned in the text.

Fonseca, myself and, to a small extent, my sons. I wish to thank my wife, Dr. Andrewes and Mr. Fonseca for suggestions made in this connection. Thanks are also due to Mr. H. Oldroyd of the British Museum (Natural History), who facilitated progress in various ways, and to M. L.-P. Mesnil of the Commonwealth Institute of Biological Control, who was good enough to inform me of certain results of his studies on Tachinidae (especially on *Erycia* and *Nemorilla*). I am grateful to Mr. Collin, Dr. Day and Mr. Fonseca for the loan or presentation to the Museum of rare species otherwise not available. Without their help it would not have been possible to attain such a degree of completeness, but I have even more reason to be thankful to the late C. J. Wainwright and his daughters for giving his collection with its long series of beautifully mounted specimens of almost all British species to the Museum. The figure of *Actia verralli* Wainwr. on the cover I owe to Mr. J. H. Burman; the other figures were drawn by myself with the aid of a camera lucida.

The ecological data are largely those given by Day (1948). If I did not carry out my original intention of copying the distributional data mainly from Wainwright's and Day's works, but in the end made use of the most important modern faunistic literature of Britain and of the collections of the British Museum, thanks are due mainly to Mr. R. L. Coe, who prepared a valuable card file of that literature for the British Museum (Natural History), who placed the most important works on my table, and who helped me with much advice and information concerning further literature, identification of collecting localities, etc. Mr. J. E. Collin has been kind enough to check and supplement the distributional data from his famous collection, a long and tedious work, which he undertook very readily, and which led to many improvements. Beyond this I owe very many thanks to Mr. Collin for reading the manuscript, making many valuable suggestions for its improvement and for much important information on nomenclatural problems.

TACHINIDAE

The Tachinidae are Diptera with a well-developed ptilinal suture (fig. 1M, *pt*), with only three antennal segments, the rest of the antenna being represented by a three-segmented bristle-like arista (fig. 1A), which is inserted near base of dorsal margin of third segment, with a longitudinal cleft on the dorso-exterior surface of the second antennal segment, with the abdominal spiracles situated in the ventral part of the tergites (fig. 1R, *sp*), with a row of hypopleural bristles (fig. 1E, *hs*), and with a well-developed postscutellum (fig. 1E, *p*). Both by their habits, numbers and often striking coloration and shape the "parasitic flies," as the Tachinidae may be named, since they contain the great majority of the flies with this habit, have always attracted numerous collectors. Unfortunately research on their classification has not been correspondingly intensive, and a sound classification has only recently been suggested by Villeneuve (1924, 1933) and worked out by Mesnil (1939, 1944). Being of such recent date, this ingenious classification has not so far been checked and applied to the whole of the family. It is therefore only natural that its use is affected by a considerable number of exceptions in addition to individual variations. Nevertheless, Mesnil's classifica-

tion is undoubtedly sound in its general lay-out, and the attempt has been made in the present keys to check, amend, and supplement this classification so as to obtain essentially natural groups and a key which leads to, as far as possible, reliable identifications. I am convinced that this type of key, though requiring careful study of the objects, leads in the long run to quicker and easier identification than "easy" or "artificial" keys, since it reduces the number of unsuccessful attempts, since it allows anyone as a rule to come to identifications not subject to doubt, and since it keeps related forms side by side. This type of key was the obvious choice also, because an excellent artificial key has recently been produced by Day (1948). Of the semi-artificial keys Stein's (1924), Lundbeck's (1927) and Wainwright's (1928-1940) papers will be found most useful.

Nomenclature presents special difficulties in Tachinidae because the important characters in this group have been realised only rather recently, and because misidentifications have therefore occurred at all times. There are thus not many names for which others have not been proposed with widely differing justification, from the ludicrous substitution of Stephanostomatidae for Sarcophaginae to the rather justified replacement of *Ocyptera* by *Cylindromyia*. The standard of the classification and the knowledge of the species as such is of course not affected by changes in nomenclature, but the names are important as means of communication like a language and as key-words to the literature. In judging proposed changes in nomenclature it must be kept in mind that the reasons for these will almost always appear convincing, since the author only proposes them because the evidence known to him has satisfied him of the "justification" or even "necessity" for a change. It is, however, next to impossible for one man to know and interpret exhaustively all the dispersed notes affecting a name, and a fuller use of the literature, or a different interpretation, or a more critical comparison of a description with specimens will prove in many cases that the change was wrong or not necessary. Moreover, the rules of Zoological Nomenclature stipulate expressly that they be suspended by the Commission "where . . . the strict application . . . will clearly result in greater confusion than uniformity." This implies obviously that the change which would lead to "greater confusion" must not be made before the Commission has been able to decide on it, since otherwise its decision would be forced by new developments. As the main catalogues and the bulk of the literature were published before name-changing assumed the alarming proportions of the present time the well-established names have been retained in this publication, although two excellent modern reference works which are widely used by British Dipterists (Kloet and Hincks and Mesnil in Lindner) have readily accepted changes. The most conspicuous deviation of these two works from the established nomenclature is the acceptance of the Meigen (1800)-Hendel (1908) names, which have been discussed very ably by Oldroyd (1949, pp. 31-33), and which since then have received their *coup-de-grâce* by an application by Sabrosky (1952) for their suppression based on the results of a statistic survey of the literature. This survey has shown that in 40 years these names, which were published "absolument" without any species names "pour ne pas anticiper sur" Meigen's main work of 1818-1838 (p. 7 of the introduction), have been fully accepted in hardly 7 per cent. of the major publications (and in only 2-5 per cent. of the non-taxonomic papers dealing with groups affected by them and listed in the *Zoological Record* for 1939,

1947 and 1948), and that uniformity can therefore much more reasonably be expected by their total suppression than by any further discussion.

Names of subgenera and split-genera have been mentioned in the keys, in order that users can easily trace their position when meeting with them in publications. Most of these names are entirely unnecessary, and their use should be strongly discouraged.

Biology in this Family presents many interesting features and much opportunity for further work, to which the conscientious amateur can easily make valuable contributions, especially concerning host-selection. Several host-lists are available, the most important of which for the British fauna are Audcent (1942; an abridged version in Day, 1948), Baer (1920–21), Brauer and Bergenstamm (1894) and Thompson (1943). These lists can of course not or hardly discriminate between well-established, doubtful and erroneous observations, and they give as a rule even less definite indications whether a Tachinid is a regular and frequent or only an occasional parasite of a certain host. An ideal host record should therefore state in some way or other at least the following data: name of parasite, determiner, host and its determiner, stage of host from which parasite emerged and stage which was attacked by parasite, way in which parasitization was proved (e.g., emergence of larva observed, parasite puparium found in host pupa, emergence hole in host pupa, parasite found in cage—the latter statement being much less valuable even if only one species was kept in a cage, since another host may have been hidden in soil, on feeding material, etc.).

The present paper does not so much intend to offer another "host list" as to show the range of potential hosts. Under the Tachinid species the hosts as found in the literature are therefore arranged according to orders and families. New records, mostly on the basis of material in the British Museum (Natural History), are marked (!), or, if they are based on a communication from a collector, by the name of the collector followed by !, both in (). Where in these cases the killed host specimen has been seen, the record has been marked (!!). The abbreviation "etc." in the host lists indicates that the parasite has also been bred from other but non-British species or genera of the same group. Where only a generic or family name or one of an even larger group without a qualifying addition like "a" or "a few" is given, the parasite attacks such a great proportion of the group of hosts that it may be regarded as a potential parasite of all of them. On p. 10–14 the hosts are listed in systematic order and the Tachinid parasites added in the order of the key, i.e., also approximately according to their relationship (which can roughly be assessed from the page numbers). No species names are given in this list, since these can be obtained from the host lists in the key, Audcent, 1942, etc. Moreover, in many cases only a single British species is contained in a host or parasite genus. By economizing in this way it was possible to print the actual names (instead of representing them by numbers, as in Audcent, 1942, and Day, 1948). The host list will thus reveal at a glance which kind of Tachinid parasites are known from a host genus and its relatives.

BRITISH TACHINIDAE (AND RHINOPHORINAE) ARRANGED IN SYSTEMATIC ORDER OF THEIR HOSTS.

Non-British families and genera of hosts, though sometimes mentioned in the keys, are not contained in this list, which, apart from Lepidoptera, is

arranged according to Kloet and Hincks (1945). The arrangement and nomenclature of Lepidoptera are largely those used in the Lepidoptera Section of the British Museum (Natural History) and are based especially on the work of Mr. W. H. T. Tams. For help and advice on this order I am much indebted to Dr. T. H. C. Taylor and Mr. H. M. Edelsten.

In some cases where only family names, etc., are mentioned in the keys the parasites are listed here under the genera concerned. Where parasite genera are mentioned for whole families, subfamilies, etc., they have been mentioned as attacking an unspecified or foreign genus or they may be expected to attack almost any species of the group; the text of the keys, the page numbers of which are given, will show which is the case. Genera, families, etc., are often used in a wide sense, or several are combined, partly because recently separated small genera, etc., will be less familiar to Dipterists, partly to avoid repetition and save room, and partly to bring out correlations between relationship and host selection.

Phylum ARTHROPODA.

CLASS CRUSTACEA. ORDER ISOPODA.

Fam. ONISCIDAE. RHINOPHORINAE. ONISCUS: *Frauenfeldia* 99; *Styloneuria* 99; *Phyto* 99; *Parafeburia* 100; *Stevenia* 101; *Melanophora* 100. PORCELLIO: *Frauenfeldia* 99; *Styloneuria* 99; *Phyto* 99; *Parafeburia* 100; *Rhinophora* 100; *Melanophora* 100; ARMADILLIDIUM: *Phyto* 99; *Frauenfeldia* 99.

Class CHILOPODA. Order CHILOPODA.

Fam. LITHOBIIDAE. LITHOBIUS: *Loewia* 43.

Class ARACHNOIDEA. Order ARANEINA.

Fam. ARANEIDAE. ARANEA: *Melanophora* 100.

Class HEXAPODA (INSECTA).

Order ORTHOPTERA.

Fam. ACRIDIDAE. CHORTHIPPUS: *Meigenia* 61.

Order DERMAPTERA.

Fam. FORFICULIDAE. FORFICULA: *Digonochaeta* 43; *Rhacodineura* 81; *Zenillia* 92.

Order HEMIPTERA (RHYNCHOTA).

Suborder HETEROPTERA: *Leucostomatini* 20; *Ocypterini* 20; *Phasiini* 20. Fam. CYDNIDAE: *Gymnosoma* 27. CYDNUS: *Alophora* 27.

Fam. PENTATOMIDAE: *Gymnosoma* 27. AELIA: *Lophosia* 21; *Cistogaster* 26. DOLYCORIS, HOLCOSTETHUS, PALOMENA: *Ocyptera* 21. EURYDEMA: *Clytiomyia* 26. ELASMUCHA: *Subclytia* 26.

Fam. COREIDAE: *Leucostomatini* 21. COREINAE. ENOPLIDS: *Leucostoma* 21. ALYDINAE. DICRANOMERUS: *Dionaea* 21. CORYZINAE. LIORHYSSUS: *Leucostoma* 21. RHOPALUS: *Leucostoma* 21.

Fam. LYGAEIDAE: *Leucostomatini* 21. LYGAEUS: *Leucostoma* 21. CHILACIS: *Alophora* 27. EREMOCORIS: *Cinochira* 98.

Fam. NABIDAE: *Leucostoma* 21.

Suborder HOMOPTERA: Fam. DELPHACIDAE. CRIOMORPHUS: ?? *Oswaldia* 59.

Order LEPIDOPTERA.

Compsilura (p. 57), which is a potential parasite of almost all caterpillars, has been omitted.

Fam. TINEIDAE. SCARDIA: *Actia* 64; *Elodia* 86. MONOPIS: *Actia* 65. TINEA: *Craspedothrix* 63; *Elodia* 86.

Fam. HYPONOMEUTIDAE: *Ptychomyia* 69; *Discochaeta* 82; *Zenillia* 92. HYPONOMEUTA: *Blondelia* 56; *Actia* 66; *Ptychomyia* 69; *Tachina* 72; *Nemorilla* 77; *Discochaeta* 82; *Bactromyia* 83; *Elodia* 86; *Zenillia* 89. SCYTHROPIA: *Discochaeta* 82. ETHMIA: *Ptychomyia* 69; *Nemorilla* 77.

Fam. GLYPHIPTERYGIDAE. ANTHOPHILA (SIMAETHIS): *Actia* 67.

Fam. SESIIDAE (AERGERIIDAE): *Leskia* 45; *Rhinotachina* 47. AERGERIA: *Pelatachina* 35; *Digonochaeta* 43. SCIAPTERON? ("Saperda galls"): *Pelatachina* 35; *Masicera* 87.

Fam. OECOPHORIDAE: *Nemorilla* 77. OECOPHORA: *Craspedothrix* 63. DEPRESARIA: *Actia* 66, 67; *Nemorilla* 77; *Elodia* 86; *Zenilla* 92.

Fam. GELECHIIDAE. SOPHRONIA: *Nemorilla* 77. ANACAMPSIS: *Elodia* 86.

Fam. OLETHREUTIDAE (EUCOSMIDAE): *Blondelia* 56; *Actia* 66; *Tachina* 72; *Winthemia* 78; *Zenillia* 89; *Paraphorocera* 88. EVETRIA: *Lypha* 42; *Leskia* 45; *Actia* 66-67. GYPSONOMA: *Phytomyptera* 63. NOTOCELLIA: *Nemorilla* 77. EUCOSMA: *Neaera* 42; *Degeeria* 61; *Phytomyptera* 63; *Actia* 65, 66; *Voria* 69; *Elodia* 86; POLYCHROSIS: *Ptychomyia* 69; *Elodia* 86. ARGYROFLOCE: *Actia* 66. CYDIA (LASSPEYRESIA, ENARMONIA, GRAPHOLITHA): *Digonochaeta* 43; *Leskia* 45; *Actia* 65; *Ptychomyia* 69; *Nemorilla* 77; *Zenillia* 89, 90; *Elodia* 86; *Eumea* 95.

Fam. TORTRICIDAE: *Blondelia* 56; *Actia* 66, 67; *Ptychomyia* 69; *Nemorilla* 77; *Carcelia* 81; *Erycia* 87. DITULA: *Actia* 66. CACOECIA: *Actia* 66, 67; *Elodia* 86; *Zenillia* 90; *Eumea* 95. PANDEMIS: *Zenillia* 90. TORTRIX: *Aporotachina* 58; *Actia* 66, 67; *Ptychomyia* 69; *Discochaeta* 82; *Elodia* 86; *Zenillia* 90; *Pales* 95. ARGYROTOZA: *Actia* 66. SPARGANTHIS: *Actia* 66; *Ptychomyia* 69; *Erynnia* 82; *Discochaeta* 82; *Pales* 95. PERONEA: *Degeeria* 61; *Actia* 66; *Ptychomyia* 69; *Zenillia* 90; *Elodia* 86; *Pales* 95.

Fam. PHALONIIDAE. PHALONIA: *Nemorilla* 77; *Zenillia* 90. CLYSIANA: *Ptychomyia* 89. PHTHEOCHROA: *Actia* 67.

Fam. PTEROPHORIDAE: *Anachaetopsis* 60. OXYPTILUS: ? *Wagneria* 40. ADAINA: *Phytomyptera* 63. OIDAEMATOPHORUS: *Actia* 67; *Pales* 95.

Fam. PYRALIDAE: *Nemorilla* 77; *Zenillia* 89, 90, 92. PHYCITINAE: *Blondelia* 56. GYMNANCYLA: *Meigenia* 61. SALEBRIA: *Meigenia* 61; *Ptychomyia* 69. DIORYCTRIA: *Digonochaeta* 43. EUZOPHERA: *Leskia* 45. ACROBASIS: *Lydina* 42. PYRAUSTINAE: *Nemorilla* 77. NOTARCHA: *Meigenia* 61 (Ent. mon. Mag. 78: 191); *Zenillia* 89, 90, 92. EURHYPARA: *Blondelia* 56; *Zenillia* 90; *Eumea* 95. PYRAUSTA: *Digonochaeta* 43; *Rhynchista* 47; *Siphona* 67; *Zenillia* 88-90; *Paraphorocera* 88. LOXOSTEGE: *Tachina* 71, 72; *Zenillia* 89; *Pales* 95. PYRALINAE: *Nemorilla* 77. PYRALIS: *Mintho* 34.

Fam. COSSIDAE. COSSUS: *Tachina* 72; *Phorocera* 74; *Xylotachina* 83; *Zenillia* 89.

Fam. PSYCHIDAE: *Zenillia* 89. PACHYTHELIA: *Stomatomyia* 69; *Gonia* 75. *Zenillia* 90.

Fam. ZYGAENIDAE: *Zenillia* 92. ZYGAENA: *Tachina* 72, 73; *Erycia* 87; *Zenillia* 91, 92; *Pales* 95.

Fam. GEOMETRIDAE: *Campylochaeta* 41; *Blondelia* 56; *Erycia* 87; *Zenillia* 90, 92. ENNOMINAE. OPISTHOGRAPTIS: *Blepharomyia* 38. SEMIOTHISA: *Zenillia* 91. ITAMA: *Oswaldia* 59. BUPALUS: *Ptychomyia* 69; *Tachina* 72; *Carcelia* 79; *Zenillia* 89. HYBERNIA (ERANNIS): *Blepharomyia* 38; *Lypha* 42; *Siphona* 67; *Phorocera* 73; *Winthemia* 78; *Zenillia* 89, 92. PHIGALIA: *Phryno* 85. BISTON, AMPHIDASIS, LYCIA: *Nemoraea* 34; *Nemosturmia* 77; *Winthemia* 78. ABRAXAS: *Siphona* 68; *Tachina* 72; *Carcelia* 79; *Discochaeta* 82; *Bactromyia* 83; *Paraphorocera* 88; *Zenillia* 91, 92; *Pales* 95. BAPTA: *Blepharomyia* 38. OURAPTERYX: *Actia* 64, 65; *Winthemia* 78. SELENIA: *Zenillia* 92. COLOTOIS: *Phytomyptera* 63; *Hebia* 82. CROCALLIS: *Campylochaeta* 40. LARENTIINAE. ACASIS: *Actia* 65. EUPITHECIA: *Actia* 64; *Siphona* 68; *Ptychomyia* 69; *Carcelia* 80; *Bactromyia* 83; *Monochaeta* 85; *Zenillia* 89, 92. HORISME: *Chrysosomopsis* 48. ANTICOLLIX: *Siphona* 68; *Bactromyia* 83. CIDARIA: *Hebia* 82. HYDRIOMENA: *Micronychia* 48; *Zenillia* 89. ENTEPHRIA: *Oswaldia* 59. TRIPHOSA: *Monochaeta* 85. EAROPHILA: *Nemorilla* 77. OEROPHTERA: *Lypha* 42; *Phorocera* 73; *Monochaeta* 85. OPORINIA: *Smidtia* 77. LARENTIA: *Winthemia* 78. ORTHOLITHA: *Gymnochaeta* 48; *Nemosturmia* 77. STERRHINAE. COSYMBIA: *Actia* 65. OENOCROMINAE. ALSOPHILA: *Pales* 95. MONOCATENINAE. BREPHOS: *Blondelia* 56; *Tachina* 72; *Zenillia* 89.

Fam. AGROTIDAE (PHALAENIDAE, NOCTUIDAE, CARADRINIDAE): *Thelaira* 33; *Pela-*

tachina 35; *Wagneria* 39; *Aphria* 47; *Eriothrix* 48; *Blondelia* 56; *Siphona* 65; *Tachina* 72; *Winthemia* 78; *Phorcida* 84; *Paraphorocera* 88; *Zenillia* 90, 92; *Eumea* 95; *Pales* 95; HYPENINAE. HYPENA: *Discochaeta* 82; *Erycia* 87. PLEURINAE. PLUSIA: *Siphona* 68; *Voria* 68, 69; *Nemorilla* 77; *Zenillia* 92; *Pales* 89. ABBEYELLA: *Ernestia* 49; *Voria* 69; *Carcelia* 79; *Zenillia* 89; EPISEMA: *Winthemia* 78; *Zenillia* 92. CATOCALINAE. ECTYPA: *Voria* 69. EUCLIDIMERA: *Voria* 69. CATOCALIA: MINUCIA: *Nemosturmia* 77; *Zenillia* 94. SARROTHRIPINAE. SARROTHRIPS: *Echinomyia* 70; *Zenillia* 90. WESTERMANNIINAE. BENA: *Bactromyia* 83; *Zenillia* 92. EUSTROTHINAE. EUBLEMMA: *Zenillia* 91. AMPHIPYRINAE. HELIOTHIS: *Echinomyia* 54; *Voria* 69; *Tachina* 71, 72; *Gonia* 76. LUPERINA: *Paraphorocera* 88. GIBBETINA: *Paraphorocera* 88. LAPHYGA: *Linnaemyia* 52; *Echinomyia* 54; *Voria* 68; *Tachina* 71; *Gonia* 76. COENOBIA: *Paraphorocera* 88. NONAGRIA: *Masicera* 87. COSMIA: *Ernestia* 49; *Phryno* 85; *Eumea* 95. CARADRINA: *Wagneria* 39. ARENISTOLA: *Paraphorocera* 88. PETILAMPA: *Gymnochaeta* 48. PHLOGOPHORA: *Echinomyia* 54; *Siphona* 68. EUPLEXIA: *Thelaira* 33. APAMEA (XYLOPHASIA, CELAENA): *Echinomyia* 54; *Carcelia* 81. HYDROECIA: *Paraphorocera* 88. ACRONICINAE. ABINITA (APATELE): *Servillia* 53; *Echinomyia* 54; *Oswaldia* 59; *Ptychomyia* 70; *Lophomyia* 70; *Tachina* 71, 72; *Carcelia* 78, 80; *Phorcida* 84; *Zenillia* 89, 90, 91; *Eumea* 95. CUCULLINAE. AGROCHOLA: *Wagneria* 39; *Carcelia* 81. CIRRHIA: *Zenillia* 89. ANTEOSCCELIS: *Wagneria* 40. EUMICHTIS: *Linnaemyia* 52; *Echinomyia* 54. COTTELLA: *Ernestia* 51; *Servillia* 53; *Voria* 69; *Phorocera* 74; *Winthemia* 78; *Histochoeta* 79; *Carcelia* 79; *Masicera* 87; *Eumea* 95. HADENINAE. LEUCANIA: *Wagneria* 39; *Echinomyia* 54; *Siphona* 68; *Gonia* 75. ORTHOSIA: *Leskia* 45; *Eumea* 44-50; *Meigenia* 61; *Actia* 66; *Voria* 69; *Ptychomyia* 69; *Phorocera* 73; *Smittia* 77; *Pachodineura* 81; *Hebia* 82; *Bactromyia* 83; *Phorcida* 84; *Phryno* 85; *Zenillia* 90; *Eumea* 95. CHARAEAS: *Gonia* 75. THOLERA: *Voria* 69. PANOLIS: *Lydia* 42; *Lophochaeta* 43; *Meriania* 49; *Ernestia* 49, 51; *Echinomyia* 54; *Gonia* 75; *Nemosturmia* 77. HADENA: *Ernestia* 51; *Siphona* 68; *Voria* 69; *Tachina* 71; *Nemosturmia* 77; *Paraphorocera* 88; *Zenillia* 89. POLIA: *Linnaemyia* 52; *Actia* 65; *Siphona* 68. MAMESTRA (DIATARAXIA, CERAMICA, MELANCHRA): *Thelaira* 33; *Paraphorocera* 35; *Ernestia* 51; *Echinomyia* 54; *Siphona* 67, 68; *Voria* 68, 69; *Tachina* 71, 72; *Phorocera* 74; *Gonia* 75, 76; *Nemorilla* 77; *Bactromyia* 83; *Mamestra* 91; *Eumea* 95. ANARTA: *Voria* 68, 69. AGROTINAE: *Ernestia* 51. AGROTIS (EUNDA, ANTEBIA, PERIDROMA, LYCOPHOTIA): *Pelatachina* 35; *Ernestia* 51; *Linnaemyia* 52; *Pelatachina* 53; *Echinomyia* 54; *Siphona* 68; *Stomatomyia* 69; *Gonia* 75, 76; *Eumea* 95. O. PROPLETRA: *Siphona* 68. AMATHES: *Wagneria* 40; *Linnaemyia* 53; *Echinomyia* 54; *Phorocera* 74; *Phorcida* 84; *Zenillia* 90; *Eumea* 95. ACTINOTIA: *Echinomyia* 54.

Fam. ARCTIIDAE: *Thelaira* 33; *Blondelia* 56; *Phorocera* 73, 74; *Winthemia* 78; *Carcelia* 81; *Zenillia* 90, 92. EILEMA: *Campylochaeta* 41. LITHOSIA: *Echinomyia* 54. CALLIMORPHA: *Nemorilla* 77; *Zenillia* 92. COSCINIA: *Nemorilla* 77. PBRAGMATOBIA: *Carcelia* 80; *Zenillia* 90. SPILOSOMA: *Nemoraea* 34; *Leskia* 45; *Ernestia* 51; *Voria* 69; *Tachina* 72; *Nemorilla* 77; *Zenillia* 89, 90. ARCTIA: *Dugesioides* 47; *Eriothrix* 48; *Voria* 68; *Tachina* 72; *Gonia* 75; *Histochoeta* 79; *Carcelia* 79, 80; *Erycia* 87; *Zenillia* 89, 90, 94; *Pales* 95. PARASEMIA: *Zenillia* 94. PANAXIA: *Carcelia* 79.

Fam. DREPANIDAE: *Tachina* 72. DREPANA: *Campylochaeta* 41; *Ceranthia* 63; *Carcelia* 79; *Bactromyia* 83; *Zenillia* 89.

Fam. SATURNIIDAE: *Zenillia* 92; *Pales* 95, 96. SATURNIA: *Ernestia* 51; *Linnaemyia* 52; *Tachina* 72; *Phorocera* 74; *Nemosturmia* 77; *Winthemia* 78; *Carcelia* 79; *Epicampocera* 84; *Masicera* 87; *Zenillia* 90.

Fam. ENDROMIDAE. ENDROMIS: *Carcelia* 79, 80.

Fam. LASIOCAMPIDAE: *Thelaira* 33; *Eriothrix* 48 ("Spinner"); *Ernestia* 49; *Echinomyia* 54; *Blondelia* 56; *Tachina* 72; *Phorocera* 74; *Carcelia* 79; *Zenillia* 92; LASIOCAMPA: *Digonochaeta* 43; *Echinomyia* 54; *Actia* 64, 65; *Tachina* 71, 73; *Masicera* 87. POECILOCAMPA: *Lypha* 42. ERIOGASTER: *Ernestia* 51; *Actia* 64; *Tachina* 73; *Pales* 95. MACROTHYLACIA: *Meriania* 49; *Echinomyia* 54; *Tachina* 73; *Carcelia* 81. TRICHIURA: *Phorocera* 74. MALACOSOMA: *Ernestia* 51; *Ceranthia* 63; *Tachina* 71, 73; *Nemosturmia* 77; *Winthemia* 78; *Frontina* 78; *Histochoeta* 79; *Carcelia* 79-81; *Phorcida* 84; *Paraphorocera* 88; *Zenillia* 89, 90, 92; *Eumea* 95; *Pales* 95. PHILUDORIA: *Meriania* 49; *Tachina* 72, 73; *Carcelia* 81; *Masicera* 87; *Zenillia* 93. GASTROPACHA: *Masicera* 87.

Fam. LYMANTRIIDAE: *Blondelia* 56; *Tachina* 72; *Histochoeta* 79; *Carcelia* 79-81; *Erycia* 87; *Zenillia* 89, 90, 92; *Pales* 95. ORGYIA: *Tachina* 73; *Carcelia* 80; *Zenillia*

90; *Eumea* 95. DASYCHIRA: *Gymnochaeta* 48; *Echinomyia* 54; *Phorocera* 74; *Nemosturmia* 77; *Winthemia* 78; *Carcelia* 80; *Zenillia* 89, 90, 94. EUPROCTIS: *Digonochaeta* 43; *Echinomyia* 54; *Actia* 66; *Tachina* 72; *Phorocera* 73; *Nemorilla* 77; *Histochoeta* 79; *Erycia* 87; *Masicera* 87; *Zenillia* 89, 90, 92; *Eumea* 95. LEUCOMA: *Linnaemyia* 53; *Tachina* 71; *Phorocera* 73; *Winthemia* 78. LYMANTRIA: *Redtenbacheria* 41; *Gymnochaeta* 48; *Ernestia* 49, 51; *Peletieria* 53; *Echinomyia* 54; *Meigenia* 61; *Ptychomyia* 69; *Tachina* 71-73; *Phorocera* 73-74; *Histochoeta* 79; *Rhacodineura* 81; *Erynia* 82; *Phryno* 85; *Erycia* 87; *Masicera* 87; *Zenillia* 89, 90; *Pales* 96.

Fam. THYATRIDAE. THYATRIA: *Zenillia* 92. ACHLYA: *Ernestia* 49. POLY-
PLOCA: *Phorocera* 73; *Carcelia* 80.

Fam. NOTODONTIDAE: *Thelaira* 33; *Tachina* 72. CLOSTERA: *Campylochaeta* 41; *Carcelia* 79; *Bactromyia* 83; *Zenillia* 89; NOTODONTA: *Digonochaeta* 43; *Micronychia* 48; *Dexodes* 58; *Brachychaeta* 81. PHEOSIA: *Digonochaeta* 43. PTEROSTOMA: *Carcelia* 79. LOPHOPTERYX: *Ernestia* 51. CERURA: *Winthemia* 78. PHALERA: *Blondelia* 56; *Carcelia* 79, 81.

Fam. SPHINGIDAE: *Thelaira* 33; *Masicera* 87; *Zenillia* 92. HEMARIS: *Linnaemyia* 52; *Echinomyia* 54. MACROGLOSSA: *Tachina* 72. HIPPIOTON: *Tachina* 72. DEILEPHILA: *Ernestia* 51; *Dexodes* 58; *Tachina* 72; *Winthemia* 78; *Phorcida* 84; *Masicera* 87. SPHINX: *Tachina* 72; *Winthemia* 78; *Frontina* 78; *Carcelia* 79; *Masicera* 87. ACHERONTIA: *Masicera* 87. SMERINTHUS, LAOTHOE: *Tachina* 72. *Winthemia* 78; *Frontina* 78; *Masicera* 87. DILINA: *Masicera* 87. CELERIO: *Ernestia* 51; *Linnaemyia* 53; *Servillia* 53; *Blondelia* 56; *Tachina* 72; *Masicera* 87. HYLOICUS: *Campylochaeta* 41; *Linnaemyia* 52; *Echinomyia* 54; *Carcelia* 79; *Phorcida* 84; *Eumea* 95.

Fam. HESPERIIDAE: *Tachina* 72; *Zenillia* 90, 92.

Fam. PTERIDAE: *Zenillia* 92. APORIA: *Blondelia* 56; *Phorocera* 74; *Zenillia* 89. PIERIS: *Tachina* 72; *Phorocera* 73; *Phorcida* 84; *Epicampocera* 84; *Masicera* 87; *Zenillia* 92; *Eumea* 95. GONEPTERYX: *Carcelia* 79; *Zenillia* 92.

Fam. PAPILIONIDAE: *Winthemia* 78. PAPILO: *Peletieria* 53; *Tachina* 72.

Fam. LYCAENIDAE: *Zenillia* 89, 92. LYSANDRA: *Zenillia* 90. CELASTRINA: *Lypha* 42. CALLOPHRYX: *Tachina* 72; *Zenillia* 88, 90. THECLA (STRYMON): *Bactromyia* 83; *Zenillia* 92.

Fam. NYMPHALIDAE: *Blondelia* 56; *Phorocera* 74; *Erycia* 87; *Zenillia* 92. ARGYNNIS: *Tachina* 72; *Winthemia* 78. MELITAEA (EUPHYDRYAS): *Tachina* 72; *Erycia* 87. VANESSA (AGLAIS, NYMPHALIS): *Pelatachina* 35; *Leskia* 45; *Ernestia* 51; *Siphona* 68; *Voria* 68; *Tachina* 71, 72; *Nemorilla* 77; *Winthemia* 78; *Erycia* 87; *Masicera* 87; *Zenillia* 90, 91; *Pales* 95. POLYGONIA: *Tachina* 72; *Zenillia* 91.

Fam. SATYRIDAE. No records.

Order COLEOPTERA (see Emden, 1950).

Dufouriini 20; *Dexiinae* 27.

Fam. CARABIDAE: *Viviania* 56. CARABUS: *Freraea* 23. AMARA: *Weberia* 24. HARPALUS: *Freraea* 23; *Weberia* 24; *Dinera* 29.

Fam. COCCINELLIDAE: *Nemorilla* 77.

Fam. TENEBRIONIDAE: *Stomatomyia* 69. BLAPS: *Stomatomyia* 69. OPATRUM: *Stomatomyia* 69.

Fam. SCARABAEIDAE: ? *Trixa* 29. MELOLONTHINAE: *Billaea* 29; *Dexia* 30. SERICINI: *Prosenia* 30. SERICA: *Dinera* 29; ? *Dexia* 30. MELOLONTHINI: *Prosenia* 30. AMPHIMALLON: *Dexia* 30. MELOLONTHA: *Dexiosoma* 28; *Dexia* 30. RUTELINAE. ANOMALINI: *Prosenia* 30. CETONIINAE: *Billaea* 29.

Fam. LUCANIDAE: *Billaea* 29.

Fam. CERAMBYCIDAE: *Billaea* 29. PYRRHIDIUM: ? *Zenillia* 93. SAPERDA: *Atrapidomyia* 29; ? *Pelatachina* 35; ? *Masicera* 87.

Fam. CHRYSOMELIDAE. CRIOCERINAE. CRIOCERIS: *Meigenia* 61. CHRYSOMELINAE: *Ptilopsina* 23; *Meigenia* 61. CHRYSOMELA (CHRYSOLINA): *Macquartia* 36; *Perichaeta* 57; *Meigenia* 61. GASTROPHYSA: *Meigenia* 61. PHAEDON: *Meigenia* 61. PLAGIODERA: *Ptilopsina* 23; *Degeeria* 61. MELASOMA (CHRYSOMELA L. of Latr.): ? *Macquartia* 37; *Meigenia* 61. PHYTODECTA: *Meigenia* 61; ? *Histochoeta* 79. PHYLLODECTA: *Meigenia* 61. TIMARCHA: *Meigenia* 61. GALERUCINAE. GALERUCILLA: *Erynniopsis* 60; *Degeeria* 61. LOCHMAEA: *Degeeria* 61. AGELASTICA:

Meigenia 61; *Degeeria* 61. HALTICINAE. HALTICA: *Arrhinomyia* 58; *Degeeria* 61. CASSIDINAE. CASSIDA: *Minella* 23.

Fam. CURCULIONIDAE: ? *Graphogaster* 23. SITONA: *Syntomogaster* 22. LIXUS: *Nyctia* 103. BALANINUS: *Winthemia* 78.

Order HYMENOPTERA.

Suborder SYMPHYTA.

Fam. PAMPHILIIDAE. ACANTHOLYDA: *Tachina* 72; *Carcelia* 81. NEUBOTOMA: *Compsilura* 57; *Zenillia* 91.

Fam. CIMBICIDAE. CIMBEX: *Compsilura* 57; *Phorocera* 74; *Carcelia* 81; *Zenillia* 94. ABIA: *Zenillia* 94.

Fam. DIPRIONIDAE: *Blondelia* 56; *Diplostichus* 70. DIPRION: *Meigenia* 61; *Voria* 68, 69; *Diplostichus* 70; *Tachina* 72; *Phorocera* 73, 74; *Zenillia* 92, 94. GILPINIA: *Ptychomyia* 70; *Diplostichus* 70. MONOCTENUS: *Staurochaeta* 59. NEODIPRION: *Zenillia* 92.

Fam. TENTHREDINIDAE. TENTHREDININAE. TENTHREDO: *Tachina* 71; *Pales* 95. TENTHREDOPSIS: *Tachina* 71. BLENNOCAMPINAE. ERIOCAMPA: *Zenillia* 90. EMPHYTUS: *Ptychomyia* 70. ATHALIA: *Blondelia* 56; *Meigenia* 61; *Tachina* 71. NEMATINAE: *Ptychomyia* 70. CLADIUS: *Tachina* 71. PRIOPHORUS: *Blondelia* 56; *Compsilura* 57. HEMICHROA: *Zenillia* 90. CROESUS: *Compsilura* 57; *Perichaeta* 57. PTERONIDEA: *Blondelia* 56; *Compsilura* 57; *Zenillia* 91. PRISTIPHORA: *Tachina* 71; *Zenillia* 90.

Order DIPTERA.

Fam. TIPULIDAE: *Trichopareia* 62. TIPULA: *Siphona* 67, 68. DICTENIDIA, TANYPTERA, CTENOPHORA: *Trichopareia* 62.

Fam. SYRPHIDAE. MERODON: *Lypha* 42.

Fam. MUSCIDAE. PEGOMYIA: *Siphona* 67.

Phylum VERTEBRATA.

Class MAMMALIA.

Order UNGULATA.

Fam. BOVIDAE. BOS: *Hypoderma* 25. OVIS: *Oestrus* 24. CAPRA: *Oestrus* 24; *Hypoderma* 25.

Fam. CERVIDAE. CERVUS: *Hypoderma* 25.

Fam. EQUIDAE. EQUUS: *Hypoderma* 25.

Order PRIMATES.

Fam. HOMINIDAE. HOMO: *Oestrus* 24; *Hypoderma* 25.

If rare species and species with unknown hosts are neglected, it will be found that the great majority of Tachinidae parasitize a wide range of hosts within the same order, and in not a few cases even in several orders. Thus all Goniinae, all Tachininae, except some Meigeniini, and all Macquartiinae, probably except *Macquartia* and *Loewia*, attack larvae of Lepidoptera and almost always those of several families. Various species of Tachininae and Goniinae are also known to parasitize larvae of sawflies, hosts similar in habitat, habits and structure (*Blondelia*, *Compsilura*, *Meigenia*; *Voria*; *Ptychomyia*, *Diplostichus*—where sawflies are the main hosts—*Phorocera*, *Tachina*; *Carcelia lucorum*, *Zenillia pexops* and other species, *Pales*). Other

genera of these groups attack (in addition, and sometimes in preference, to Lepidoptera) Diptera (*Siphona*), Chrysomelidae (*Meigenia*, *Degeeria*, *Histochoeta* ?), phytophagous Coccinellidae (*Nemorilla*)—the latter two groups of hosts again similar to caterpillars in habitat and habits—terricolous Tenebrionidae (*Stomatomyia*), Curculionidae (*Winthemia*) and Forficulidae (*Rhacodineura*, *Zenillia*). In these two subfamilies, Tachininae and Goniinae, some species of Meigeniini are the only forms not known to attack Lepidoptera (*Viviania*, living in Carabidae; *Arrhinomyia* and *Erynniopsis* in Chrysomelidae, *Trichopareia* in leatherjackets, *Perichaeta* in sawfly larvae and *Chrysomela*).

In Macquartiinae all forms with projecting mouth-margin seem to be polyphagous parasites of Lepidoptera and do not apparently attack hosts of other orders. The bulk of the forms with non-projecting mouth margins follow obviously the same pattern but *Wagneria* seems to attack almost exclusively Noctuid larvae, *Digonochaeta* is a regular parasite of earwigs in addition to Lepidoptera, and *Lypha*, a common parasite of various Lepidoptera, has once been bred from a Syrphid. *Loewia foeda*, the only species of its genus which has ever been bred, is a regular parasite of centipedes and probably does not attack caterpillars and other insects. The species of *Macquartia* are regular parasites of Chrysomelid larvae, and the only summary record from a caterpillar without any details requires confirmation.

Most of the groups so far mentioned, then, are typically polyphagous, the more or less oligophagous exceptions being *Macquartia*, *Loewia*, *Viviania*, *Erynniopsis*, *Arrhinomyia*, *Trichopareia* and, as far as their hosts other than Lepidoptera and sawflies are concerned, *Siphona*, *Meigenia*, *Degeeria*, *Histochoeta* ?, *Perichaeta*, *Stomatomyia* and *Rhacodineura*. (*Nemorilla*, *Winthemia* and sbg. *Phryxe* are here omitted, because their parasitism in Coleoptera or Coleoptera and Dermoptera seems to be due rather to extreme polyphagy than to oligophagy.) There appear to be in the subfamilies Tachininae and Goniinae a few oligophagous genera, the host-selection of which is, like that of *Wagneria*, almost or wholly restricted to one family of Lepidoptera. This is possibly the case in *Anachactopsis*, *Monochaeta* (GEOMETRIDAE), *Gonia* (AGROTIDAE) and *Xylotachina* (*Cossus*), whilst a few other genera seem to have a marked preference for certain groups of hosts: *Phorcida*, *Voria*, *Elodia* (TINEIDAE), *Erycia* (LYMANTRIIDAE) and *Paraphorocera* (AGROTIDAE). Host preferences will exist in many more cases where a certain species or groups of hosts are much more often attacked than all the others, and it is known that during over-abundance of certain caterpillars or sawfly larvae their parasites seem to concentrate on them. In other cases some groups of insects may be attacked only at seasons when the primary hosts are not available, but much research of a quantitative, statistical nature will be necessary to put observations of this type on a secure basis. Some of the problems involved have been discussed for *Compsilura* by Webber and Schaffner (1926, *Bull. U.S. Dep. Agric.* 1363).

In the first two subfamilies, however, matters are very different, the Dexiinae being regular and virtually exclusive parasites of larval Coleoptera (a few records from Lepidoptera are not sufficiently substantiated, and only the South American *Paratheresia* is proved to be a regular parasite of certain Lepidoptera, probably in addition to Coleoptera which share the habitat), and in the Phasiinae the Leucostomatini, Ocypterini and Phasiini are ex-

clusive parasites of Heretoptera, the Dufouriini of (mostly adult) Coleoptera, and the Oestrini of Mammalia.

It should be kept in mind that the preceding account is based largely on the published host lists. Although certain strange records have been traced to their source and scrutinised,³ this has, of course, not been possible for the bulk of the records, which have been accepted if they appear consistent with each other. It is quite possible that further research into host-selection and even a detailed study of the literature may modify the above conclusions.

A second fascinating chapter of the biology of this group concerns the types of oviposition and in connection with it of eggs and first-stage larvae, and of entering the host. Pantel (1910) has defined ten types of oviposition, and these have been widely used, so that it is advisable to retain them even though their arrangement is not in every respect ideal. Baer (1920 : 202) has named most of these groups after one of the genera contained in them. In the following account of these groups only British genera are mentioned.

1. *Parasetigena* group. Oviparous; egg of normal size, flattened below and deposited on the skin of the host; number of eggs normal; vagina not modified. *Gymnosoma*, *Clytiomyia* (i.e., probably all Phasiini except *Alophora*); *Meigenia*, *Tachina*, *Phorocera* (sbg. *Parasetigena* and *Phorocera* s. str.), *Diplostichus* (G. J. Kerrieh !), *Ptychomyia*, *Nemorilla*, *Winthemia*.

2. *Gonia* group. Oviparous at advance state of embryogenesis; eggs very small, dark with pale underside, deposited on the food plant and ingested by host; number of eggs very great, vagina forming a uterus. *Frontina*, *Gonia*, *Histochoeta*; *Brachychoeta*, *Rhacodineura*; *Phryno*, *Erycia*?, *Masicera*, *Monochaeta*, *Hebia*, various *Zenillia*, *Eumea*, *Pales*.

3. *Sarcophaga* group. Larviparous; eggs banana-shaped, larvae hatching and increasing in size in the uterus, which is short with a transverse sac-like dilation; progeny moderately numerous. Sarcophaginae including some Miltogrammini.

4. *Echinomyia* group. Ovoviviparous or larviparous; larvae very small covered with small black plates, which are contiguous in contracted larvae and reduce transpiration; eggs deposited in vicinity of hosts; numerous ovarioles, eggs regularly arranged in the large extensible uterus. *Nemoraea*, *Lydina*, *Lypha*; *Micronychia*, *Gymnochoeta*, *Chrysosomopsis*, *Ernestia*, *Meriania*; *Linnaemyia*; *Peletiera*, *Servillia*, *Echinomyia*, i.e., Nemoraeni, Helocerini (part), all Echinomyiini except the Aphriina.

5. Biology probably similar, but fecundity smaller, fewer ovarioles, uterus more slender, arrangement of eggs in regular rows or more irregularly lengthwise. *Digonochaeta*, *Neaera* (Helocerini); *Macquartia* (Macquartiini); *Eriothrix* (Aphriina); *Billaea* = *Myiocera* (Dexiinae).

6. *Plagia* group. Ovoviviparous or larviparous; like preceding two groups, but progeny deposited on the host. *Pelatachina*, *Phyllomyia* (Mac-

³ As an example and warning *Gonia* may be mentioned, parasitizing *Bombus* and *Anthophora* according to published host lists, which follow the authority of Zetterstedt and Schiner. The sole source of this record is an account by Wahlberg (1843, *Förh. Skandin. Naturf. Mote* 3 (1842) : 243) on the shadowing of *Anthophora* by a *Miltogramma*, which account contains the sentence: "I have observed the same behaviour in . . . *Gonia fasciata* Meig., which for the same reason follows . . . *Bombus terrestris*." Without mentioning *Gonia* again Wahlberg then describes how *Miltogramma* deposits its egg on the bee. There is no mention of Wahlberg having seen *Gonia* deposit its egg (see group 2 on this page), let alone *Gonia* parasitizing an Apid larva.

quartiini); *Thelaira* (Thelairini); *Leskia*, *Myiobia* (Leskiini); *Siphona* (Siphonini); *Voria*, *Plagia*, *Athrycia*, *Cyrtophleba* (Voriini); *Zenillia vulgaris* and *affinis*, *Eumea hortulana*.

7. *Compsilura* group. Ovoviviparous or larviparous; progeny inserted by the female into the host after the latter's skin has been perforated by means of a separate piercer; eggs obliquely arranged in the uterus in single file. *Compsilura*, *Blondelia*, probably *Microvibrissina* (i.e., Meigeniini with piercer).

8. *Weberia* group. Ovoviviparous or larviparous; progeny inserted by female into host by means of an ovipositor acting as piercer. *Weberia* (pars), *Freræa*?

9. Oviparous; eggs introduced into host by complicated structure for holding the host and piercing its skin; eggs soft-skinned, often tapering behind. *Alophora*; *Ocyptera*?; *Leucostoma*?

10. *Carcelia* group. Oviparous; eggs soft-skinned, stalked, attached by female to hairs of host. *Carcelia*.

As will be seen, the more primitive flies, Sarcophaginae, Dexiinae and Macquartiinae, are found only in groups 3-6, and conversely these groups contain only primitive Tachinids apart from Siphonini, Voriini and two *Zenillia* in group 6. A more logical grouping which would seem to reflect the phylogenetic development is the following:

A. Larviparous or ovoviviparous, progeny *not* deposited on host except in some Sarcophaginae, where the host is normally dead or paralysed (Pantel's groups 3-5).

(i) Larvae actively seeking out the host: Sarcophaginae, Dexiinae.

(ii) Progeny placed near host and ingested by host: Macquartiinae, except groups mentioned under B. (Larvae and biology: Thompson, 1923.)

B. Larviparous or ovoviviparous, progeny deposited *on* host (transitional groups). Macquartiinae (Thelairini, Leskiini, some Macquartiini); Siphonini and Voriini of Tachininae; some *Zenillia*, *Eumea hortulana* (Pantel's group 6).

C. Oviparous or progeny introduced into host.

(i) Oviparous, eggs small, not deposited on or in host, ingested by host. Many Goniinae. (Pantel's group 2.). (Larvae and biology: Thompson, 1924).

(ii) Eggs deposited on host or in host, or larvae (or eggs about to hatch) introduced by piercing the skin.

(a) Hosts are Heteroptera, adult (seldom larval or pupal) Coleoptera, or Mammalia; eggs laid on host or introduced by piercing ovipositor or by ovipositor supported by structures for clasping host. Phasiinae (Pantel's groups, 8, 9 and in part 1).

(b) Hosts are larvae of Lepidoptera and sawflies, sometimes adult or larval Coleoptera or other groups.

α Eggs deposited *on* host: *Meigenia* (Meigeniini), Tachinini, Winthemiini (Pantel's group 1 in part); stalked eggs deposited on host: *Carcelia* (Carceliini) (Pantel's group 10).

β. Larvae or eggs about to hatch introduced *into* host through a wound inflicted by a piercer which is not formed by the tip of the ovipositor; some Meigeniini (Pantel's group 7).

Many genera and tribes remain to be placed in these biological groups, and there are many other interesting chapters in the biology of the Tachinids,

such as number of parasite larvae per host, rate of multiplication, time and place of pupation and factors influencing the place, exterior and interior reactions of the host, hibernation, metabolism of the parasitic larvae, economic importance, biological control of pests with Tachinidae, etc. Many of these problems have been discussed by Baer (1920-1921), but much is still to be discovered.

KEY TO SUBFAMILIES.

- 1 (6) Prosternum bare (fig. 2A, p), seldom hairy or setulose, but then (*Oestrus*, *Lydina*, *Micronychia*) the hind tibia (fig. 2E, pv) with a well-developed *pr* apical spur (subequal to the *av* one). Reclinate upper frontal setae normally absent (cfr fig. 2D, r), i.e., very seldom 2-3 pairs of differentiated reclinate setae present somewhat in front of the vertical setae (the uppermost inclinate setae may however become gradually more reclinate as in fig. 2c, but they are neither stronger than, nor more distant from, the other inclinate setae, and the posterior one is not placed markedly outwards of the preceding one). females and dichoptic males often with a praevertical seta (fig. 2c, pr), i.e., a single strong seta somewhat in front of the verticals, which is directed outward. Hind tibiae very often with a *pv* apical spur (fig. 2E, pr).
- 2 (3) Never more than two⁴ *post ia* (fig. 2G, ia), sometimes none; if two are present, they are widely separated as though the original intermediate setae were absent. Mouth-margin always distinctly projecting and visible in profile between the vibrissae (fig. 2c, *m* and *v* respectively) or (*Oestrini*, the latter absent, in this case the thorax without dorsal setae among the hairs. Anata virtually bare (fig. 2c, *a*). Base of abdomen hardly excavate behind scutellum (fig. 2M), the excavation never approaching the hind margin of the first segment. Genitalia often exerted and striking, especially in female. ♂: Anterior parameres wholly or partly (basal part) fused with posterior parameres, except apparently in Dufouriini other than *Wederia* and *Freraea* (Rubtzov 1951).....PHASINAE p. 19.

⁴ It is very difficult to separate such genera as *Ptilopsina*, *Syntomogaster*, *Graphogaster*, etc., from Macquartiini, and the Dufouriini appear in fact to be closely related to that tribe. In the present key these intermediate genera will normally be traced to Macquartiini, where the user is referred back to Dufouriini.

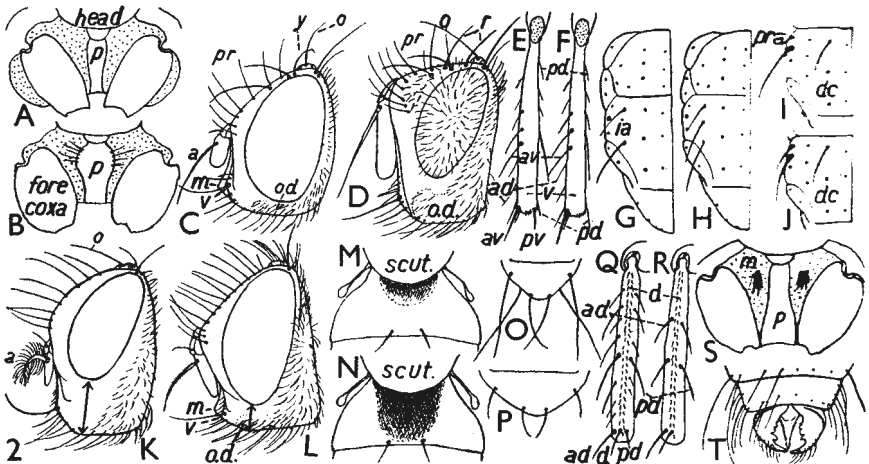


FIG. 2.

- 3 (2) As a rule 3 *post ia* (fig. 2H); if only two are present, it is obviously the first one which has been lost; if only one (or one distinct *ia*) is present, the mouth-margin not projecting between vibrissae (fig. 2D and H), or the arista plumose (fig. 2K, a).
- 4 (5) Jowls as wide as, or wider than, the combined length of the second and third antennal segments (fig. 2K, †), and without an occipital dilation (except in *Atropidomyia*, *Dinera* and *Estheria bohemani*, all of them with conspicuously hairy arista). Eyes rather small, never hairy. Antennae short, inserted below middle of eyes, first segment not projecting; arista plumose (fig. 2K, a) or conspicuously hairy (fig. 6C) except in *Trixa* (fig. 6D). Frontal setae very seldom descending below base of antennae. ♂: Only one paramere present, its base attached to penis (Rubtsov 1951).
Parasites of beetle larvae (and sometimes beetle pupae) DEXIINAE (p. 27).
- 5 (4) Jowls narrower than the combined length of the second and third antennal segments (fig. 2L †), or, if not narrower, with an occipital dilation (fig. 2C, D and L, *o.d.*). Frontal setae often descending below insertion of antennae (fig. 2D and L). Face without a keel between the antennae. ♂: Anterior and posterior parameres present, both entirely free (except *Eriothrix* where they are as in Dexiinae) (Rubtsov 1951) MACQUARTIINAE (p. 31).
- 6 (1) Prosternum with one or more black setulae on each side (fig. 2B, *p*), seldom bare (*Hebia*, *Xylotachina*, *Perichaeta*, most *Voriini*), but then 2-3 pairs of well-differentiated reclinate upper frontal setae present (fig. 2D, *r*). Hind tibia (fig. 2E, *pv*) without a *pv* apical spur.⁵ Mesonotum always with well-developed setae among the hair. Arista more or less bare. Frontal setae descending below the base of the antennae (fig. 2D). Face without a keel between the antennae. ♂: Anterior and posterior parameres present, both entirely free, figs. 1R, 22O, P, *pm* (Rubtsov 1951).
- 7 (8) *pra* distinctly shorter and finer than the first *post dc* (fig. 2I), sometimes absent. Basal excavation of first abdominal segment behind scutellum often not reaching hind margin (fig. 2M). Females almost always with a praeventral seta (see fig. 2, *y*), i.e., a seta close to the verticals which is directed outward. More elongate forms TACHININAE (p. 55).
- 8 (7) *pra* as long and strong as the first *post dc* or even stronger (fig. 2J). Basal excavation of first abdominal segment behind scutellum almost always reaching hind margin (fig. 2N). More robust species GONIINAE (p. 74).

Subfamily PHASIINAE.

KEY TO TRIBES.

- 1 (2) Dorsum more or less evenly haired, without any clearly differentiated setae. Prosternal sclerite (*Oestrus*) or membrane (*Hypoderma*) hairy (fig. 2B, *p* and *s, m*). Mouth opening small and mouthparts very small or vestigial (fig. 4o and *p*). ♀: genitalia retractile.
Parasites of mammals (Ungulata and occasionally man) OESTRINI (p. 24).
- 2 (1) Dorsum, at least of thorax, with some well-differentiated setae. Prosternum (fig. 2A, *p*) bare (both sclerite and membrane). Mouth-opening large and mouthparts well developed.
- 3 (8) Two *post ia* (fig. 2G), less often the posterior one only developed, in these cases the hind tibiae with a *pv* apical spur (fig. 2E, *pv*) or with more than two *d* preapicals (i.e., at least a *pd* preapical present in addition to the *d* and *ad* preapicals, fig. 2Q). Scutellum (fig. 2, *o*) with three pairs of marginal setae (but in *Ocyptera interrupta* with only one).
- 4 (5) Ocellars curved outwards and backwards (fig. 2c, *o*). Hind tibiae with three *d* preapicals (*ad, d* and *pd*, fig. 2Q), without a *pv* apical spur (fig. 2F). Frons of male much narrower than that of female, but 2-3 times as wide as ocellar

⁵ This is not true of *Gonia* and *Rhacodineura*, which, in spite of their *pv* apical seta are placed in this section. *Brachychaeta* and some *Trichopareia* also have a small *pv* seta. It is next to impossible to allow for these exceptions at this point, so reference has been made to them in the keys to Macquartiinae.

tubercle. Female with an outwardly-bent praevertical seta (fig. 2c, *p*) and with distinctive forcipate terminalia (reminiscent of the cerci of an earwig but much smaller—fig. 2x). 3 *post dc*; 1 + 1 *acr*. Lateral scutellars indistinct, basal, subapical and apical ones strong (fig. 2o). Halteres fuscous.

Parasites of HETEROPTERA (and reputedly COLEOPTERA)

LEUCOSTOMATINI (p. 20).

- 5 (4) Ocellars proclinate (see fig. 2D, *o*), sometimes curved outwards and only slightly forward, or indistinct, seldom (sometimes in *Ocyptera*) curved slightly backwards, in this case the hind tibia with only 2*d* (*ad* and *d*) preapicals (fig. 2R). Frons of male as wide as that of female or less than twice as wide as ocellar tubercle (but in *Weberia* about thrice as wide). Female terminalia not forcipate, though often large and doubled back on ventral surface of abdomen (fig. 3s).
- 6 (7) Lateral part of occiput wholly or partly clothed with whitish hair (fig. 3D and E). Metasternum closed behind hind coxae by a broad, darkly sclerotized bridge (fig. 3A, ↑). Hind tibiae with a distinct *pv* apical spur (fig. 2E, *pr*). Third antennal segment (fig. 3D and E) much longer than the jowls are wide, first segment projecting, contiguous at base. 3 *post dc*. Very elongate forms.
Parasites of HETEROPTERA..... OCYPTERINI (p. 21).
- 7 (6) Lateral part of occiput clothed with black hair only (fig. 2F). Metasternum broadly open behind hind coxae (fig. 3B, ↑), except in *Weberia pseudofunesta* where the hind tibiae have no *pv* apical spur (fig. 2F). Third antennal segment short or moderately short (fig. 3J). ♂: frons without proclinate or praevertical setae (fig. 3J), at narrowest part at most thrice as wide as (*Weberia*), but usually not wider than, ocellar tubercle.
Parasites of COLEOPTERA as far as known..... DUFOURIINI (p. 21).
- 8 (3) Only the hindmost *post ia* seta present. Hind tibiae without a *pv* apical spur (fig. 2F) and with at most a *d* and *ad* preapical (fig. 2R). Scutellum often with only two pairs of marginal setae (fig. 2F).
Parasites of HETEROPTERA (Xysta?)..... PHASINI (p. 25).

Tribe LEUCOSTOMATINI.

KEY TO GENERA AND SPECIES.

- 1 (2) *R*₅ with a long stalk; *r-m* beyond middle of discal cell (fig. 3F, *d*). Pollinosity of parafrontalia and parafacialia greyish white. Thorax with distinct vittae, very thinly whitish dusted; abdomen glossy black, without discals. (Figs. 2c, t, 3F). 4·4-5 mm.

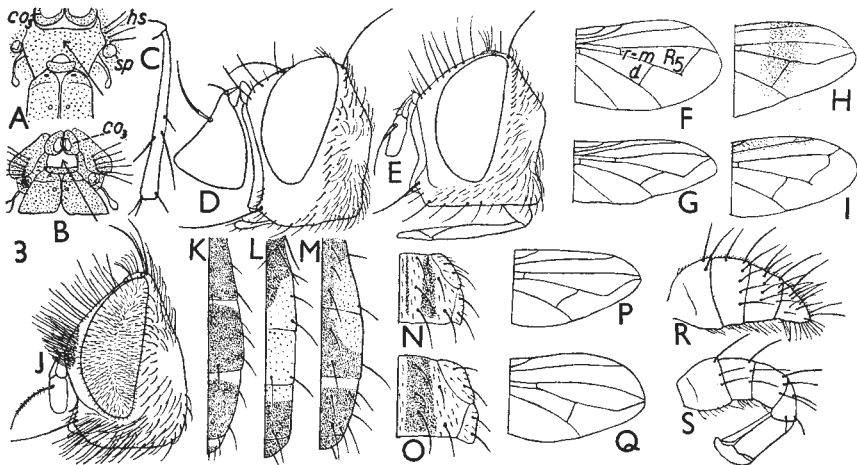


FIG. 3.

Hosts unknown, foreign species in *Enoplops scapha* F., *Liorhyssus hyalinus* F., *Rhopalus subrufus* Gmel., etc. (COREIDAE), *Lygaeus* (LYGAEIDAE), and *Nabis* (NABIDAE). *Sussex, Hants., Bucks., Norfolk.* vii-viii

Leucostoma simplex Fallén.

- 2 (1) R_5 open or closed in margin, not petiolate; $r-m$ basad of middle of discal cell (fig. 3G). Parafrontalia and parafacialia golden dusted. Thorax whitish dusted with four narrow black vittae, the paramedian two coalescing behind suture; abdomen conspicuously dusted; with rather irregular median discals. Fig. 3G. 6.5-7.5 mm.

Hosts unknown: a foreign species parasitizes *Dicranomerus* (COREIDAE). *Putsborough, N. Devon, e.vii-b.viii, sand dunes, around Senecio jacobaea*

Dionaea aurifrons Meigen.

Tribe OCYPTERINI.

KEY TO GENERA AND SPECIES.

- 1 (2) R_5 open at apex (fig. 3H). Anterior *post ia* weaker than posterior one (see fig. 2G). Wings with a suffused transverse band before apex (fig. 3H). 1(2) + 0 very fine (often hairlike) *stpl.* Abdomen (fig. 3K) wholly black with thinly white-dusted basal bands; without discals. Thorax black with whitish dusted shoulders and median vitta. Third antennal segment axe-shaped, more so in male. ♂: fig. 3D, H, K. 8-10 mm.
Bred from Aelia (PENTATOMIDAE). *Kent to Hants. to Gloucs. to Cambs. Co. Kerry.* e.vii-m.viii
- (1) R_5 closed and stalked at apex (fig. 3I). Anterior *post ia* much stronger than posterior one. Wings not banded. Third antennal segment not axe-shaped, almost parallel-sided (fig. 3E). 1 + 1 or 2 + 1 (see fig. 4F) strong *stpl.*⁶ Abdomen largely reddish orange on anterior segments, with or without a black median vitta (fig. 3L and M) **Ocyptera** (p. 21).

Genus Ocyptera Latreille, 1804.

KEY TO SPECIES.

- 1 (2) Three pairs of scutellars, apical ones much smaller and decussate. Abdomen without discals (fig. 3L). r_1 much exceeding level of $r-m$. The exterior, broader undusted vittae of thorax separated from the linear paramedian vittae by a whitish-dusted stripe (fig. 3N). Black median vitta of abdomen almost always broadly interrupted on third and posterior part of second segment. 10-13 mm.
Parasite of PENTATOMIDAE (*Dolycoris, Holcostethus, Palomena*). *Cornwall: Lizard. Co. Cork: Glengarriff.* b.viii
- 2 (1) Only one (the subapical) pair of scutellars distinct, strong and diverging. Abdomen (fig. 3M) with discals (often 2-3 pairs behind each other) on first to third segments and with marginals. r_1 exceeding level of $r-m$ by at most length of latter (fig. 3I). The exterior undusted vittae of the thorax fused with the paramedian vittae into a pair of very broad vittae (fig. 3O). Black median vitta of abdomen complete and well-defined. ♂: fig. 3E, I, M, O. 6-7.5 mm.
Hosts unknown. Surrey, Sussex to Devon, Cambs., Suffolk. e.v-e.vi, e.vii-b.ix

interrupta Meigen.

Tribe DUFOURIINI.

KEY TO GENERA.

- 1 (2) $m-m$ closer to bend than to $r-m$ (fig. 3P). Eyes conspicuously hairy (fig. 3J). 2 strong and widely separated *post ia*. Species with ovate abdomen, the first segment not or only slightly longer than the second. Glossy black with

⁶ Only 1 *stpl* (see fig. 4G) and only one (the subapical) pair of marginal scutellars distinct, strong and diverging. Abdomen without discals. 5-6.5 mm. *O. (Ocyptera) pusilla* Meigen. (The British record is almost certainly due to a confusion with *O. interrupta*.)

- slight dust on shoulders, etc. Abdomen (fig. 3R) with strong discals and marginals. Parafrontalia broadly setose anteriorly (fig. 3J). Halteres fuscous. 3 strong *post dc.* ♂: frons at narrowest part not more than twice as wide as ocellar tubercle. **Minella** (p. 23).
- 2 (1) *m-m* at middle or closer to *r-m* than to bend (fig. 3Q), nearly upright. Eyes bare. Often a small third (most anterior) *post ia* present. Mid tibia with only one or without an *ad.*
- 3 (6) R_5 with a conspicuous stalk (fig. 4C-E). Inner margin of lower calyptra closely adjacent to lateral margin of scutellum (fig. 4J ↑), converging posteriorly with longitudinal axis; lower calyptra of male fuscous. *prst ia* as a rule distinct. ♂: frons very narrow (seldom approaching width of third antennal segment).
- 4 (5) Stalk of R_5 shorter than *r-m* (fig. 4C), extending the longitudinal axis of R_5 , i.e., joining both r_{4+5} and *m* at an obtuse angle, apex of R_5 acute, bend of *m* obtusely rounded. Two pairs of strong marginal scutellars in addition to the apical pair, lateral ones especially strong and strongly diverging (fig. 4J). Hind tibia with three subequal *d* preapicals (see fig. 2q). Body and legs (and antennae and palpi of male) fuscous black; the head, sides of thorax, the part in front of scutellum, and anterior triangles on the abdominal segments silver-white dusted (fig. 4L); the black undusted pattern of thorax forming a pair of paramedian vittae and of diverging spots from neck backward. ♂: halteres fuscous. ♀: halteres infusate reddish; calyptrae whitish; antennae and palpi orange. Fig. 4C, J, L. 2.5-4.5 mm. (*Campogaster* Rond.).

- Parasite of adult Sitona (CURCUL.). Kent to Hants. to Hereford to Worcs. to Surrey.* b.-e.v, m. vi-b.vii, b.-m.viii . . . **Syntomogaster exigua** Meigen.
- 5 (4) Stalk of R_5 about as long as apical cross-vein or *m-m*, prolonging r_{4+5} to the margin (fig. 4D and E), i.e., joining *m* at an obtuse to almost right angle but not r_{4+5} . Hind tibia with only two strong preapicals (see fig. 2r). Disc of thorax with almost uniform pollinosity, which is dark brown and thin in male, pale grey and rather dense in female. **Graphogaster** (p. 23).
- 6 (3) R_5 open, seldom (individually) closed in margin (fig. 4M and N). Either inner margin of lower calyptra strongly diverging from scutellar margin and longitudinal axis (fig. 4K ↑), or calyptrae whitish at least in male. r_{4+5} ending in wing tip (fig. 4M and N). Halteres fuscous.
- 7 (10) Free inner margin of lower calyptra rather straight, converging backwards with longitudinal axis of fly, closely adjacent to lateral margin of scutellum for some distance, and more abruptly turning outwards (see fig. 4J ↑).

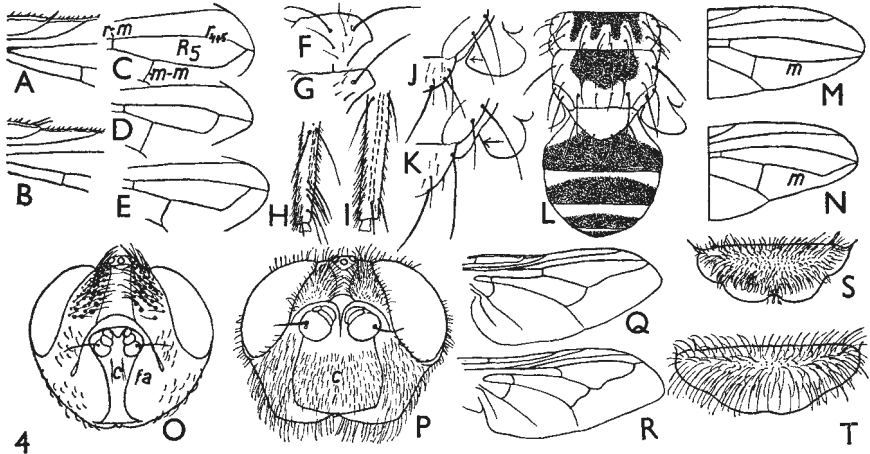


FIG. 4.

- 8 (9) *m* with a well-defined rounded or obtuse bend (see fig. 4N). 3 strong *post dc*. Abdomen with strong marginals but without discals on first to third segments (fig. 3s). Parafrontalia with a single row of inclinate setae and at most a few hairs closely adjacent (apart from the two proclinate setae of the ♀), parafacialia bare. Species with oblong-ovate abdomen, the first segment much longer than the second (fig. 3s). At least the shoulders conspicuously dusted **Weberia** (p. 24).
- 9 (8) *m* broadly and evenly curved from *m-m* to apex, without a defined bend (fig. 4M). Disc of thorax without setae, except for 1 *dc* and 1 *ia* in front of scutellum; 1 *stpl*. Abdomen with only short decumbent hairs. Parafrontalia with a band of setulae outside the row of frontal setae; parafacialia with a single (♂) or multiple (♀) row of setulae. Wholly glossy black, base of tibiae and some sutures yellowish translucent, antennae pale brownish. ♀: fifth abdominal segment long, doubled back under abdomen, terminal segments retractile but ending in a claw-shaped piercer. Fig. 4M. 3.4-4.5 mm.
- Parasite of adult CARABIDAE* (Carabus, Harpalus), the integument of the host being probably pierced by the female when depositing the eggs; several larvae develop in one host specimen and pupate in it. Suffolk: Brandon, 22.vi; Berks.: Tubney, 17.vii. Perth: Pitlochry... **Freraea albipennis** Zetterstedt.
- 10 (7) Free inner margin of lower calyptra strongly convex, diverging from lateral margin of scutellum and longitudinal axis of fly from base onwards and passing gradually into the strongly rounded apical margin (fig. 4K). *m* with a well-defined obtusely rounded bend, apical cross-vein somewhat concave (fig. 4N). Disc of thorax with 2 + 3 long and strong *dc* and usually distinct *prsc*; 2 *stpl*. Abdomen with long and erect marginals and discals; hair long and erect in male, decumbent in female. Parafacialia bare. Wholly fuscous-black, moderately shining, with thin dark-brown dust; palpi brown (♂) or orange (♀). Fig. 4K, N. 3.5-4.5 mm.
- Larva in CHRYSOMELINAE* (Plagiodera). Inverness: nr. Grantown-on-Spey, e.vi-m.vii, numerous on aspen **Ptilopsina nitens** Zetterstedt.

Genus **Minella** Robineau-Desvoidy, 1830.

(= *Dufouria* Robineau-Desvoidy, 1830, Villeneuve, 1929)

KEY TO SPECIES.

- 1 (2) Costal spine small (somewhat shorter than *r-m*) (fig. 4A). Second abdominal segment with only 2(-3) discals near median line. ♂: frons at narrowest part less wide than ocellar tubercle. Fig. 4A. 4.3-5.0 mm.
- Bred from larvae, pupae and adults of Cassida nobilis Linnaeus and vittata Villers. Kent to Devon to Brecknock to Norfolk. Perth.: Callander (!). b.vi-e.vii nigrita* Fallén.
- 2 (1) Costal spine conspicuously longer than *r-m* (fig. 4B). Second abdominal segment with more numerous discals near median line, at least in male, arranged in pairs or irregular rows behind each other. ♂: frons at narrowest part wider than ocellar tubercle. ♂: fig. 3J, P; ♀ fig. 3R, 4B. 5.3-6.7 mm.
- Bred from Cassida viridis Linnaeus (in Wainwright coll !) and, abroad, from C. deflorata Suffrian. Kent to Cornwall to Pembs. to Radnor to Norfolk; Lancs. e.v-b.vii chalybeata* Meigen.

Genus **Graphogaster** Rondani, 1868.

KEY TO SPECIES.

G. fasciata has been placed in *Syntomogaster*, and it may be the most natural course to unite the two genera.

A non-British species is known to parasitize adult weevils.

- 1 (2) Mid-tibia with an *av* seta (see fig. 3C). Stalk of r_{4+5} joining r_{4+5} in an even slight curve, while joining *m* (apical cross-vein) at an obtuse angle (fig. 4E). 3 strong and long *post dc*, and often a weaker fourth between the first and second; lateral scutellars strong, subapical ones moderately strong. Abdominal segments 2-4 with strong and very long marginals and discals. Fuscous-black.

male with slight brown-grey dust at shoulders, etc., female densely grey dusted with 2 or 4 narrow brown vittae on thorax and brown hind margins on abdominal segments. ♀: parafrontalia twice as wide above middle as interfrontalia. 3.5-4.5 mm.

The pupa has been found under bark. N. Scotland : Sutherland : Glen Shin ; Moray : Culbin Sands. Inverness : nr. Grantown-on-Spey ; Loch Garten ; Once Kent : Tunbridge Wells. e.vi-m.vii, b.viii. brunnescens Villeneuve.

- 2 (1) Mid tibia without an *av* submedian seta. Stalk of R_5 forming an angle of about 170° with r_{4+5} , whilst the apical cross-vein joins this point at almost right angles (fig. 4D). 4 subequal strong but not long *post dc*; lateral and sub-apical scutellars indistinct (see fig. 4K). Abdomen with fine and often in part indistinct marginals and discals. Fuscous-black, interfrontalia, ground-colour of abdomen, and in female antennae (wholly or largely), palpi, femora and tibiae orange; abdomen with broad fuscous hind margins. ♀: parafrontalia narrower than interfrontalia. Fig. 4D. 2.6-3.7 mm.

Kent to Dorset to Hereford to Norfolk. Inverness : Aviemore. m.v-m.vi. fasciata Macquart.

Genus *Weberia* Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (2) Only 1 *post ia*. 2(3) + 1 *stpl* (fig. 4F). Hind tibia with a whole tuft of *d* and *ad* preapicals (fig. 4H). Metasternum normal, broadly membranous behind hind coxae (see fig. 3B). Thorax rather densely dusted, in front with a pair of faint linear diverging dark vittae and a more conspicuous paired black spot. Abdomen thinly dusted; second segment less than twice as wide as long. Fig. 4F, H. 4.5-7 mm.

Hosts unknown. Hereford : Mains Wood ; Sussex : Guestling, Hastings. e.vii. thoracica Meigen.

- 2 (1) 2 Strong *post ia*. 0(1) + 1 *stpl* (fig. 4G). Hind tibia with the normal 1 *d* and 1 *ad* preapical (fig. 4I). Metasternum fused behind hind coxae, forming a broad sclerotized bridge (see fig. 3A). Thorax black and glossy, in front with a paired faint white-dusted vitta along the *dc*. Abdomen black and glossy; second segment more than twice as wide as long. ♂: frons more than a fifth head-width; verticals strong. ♀: last abdominal segments (fig. 3S) long and striking, curved forward below abdomen. Figs. 3Q, S, 4G, I. 3.6-5 mm. (*funesta* Meigen of Stein, *curvicauda* auct., nec Fallén).

A related non-British species (♂ frons narrower than antennae ; verticals absent : curvicauda Flin.) is a parasite of CARABIDAE (Amara, Harpalus). *Kent to Sussex to Worcs. to Notts. to Norfolk. Channel Is. m.v, b.vi, e.vi, m.vii-b.ix. pseudofunesta* Villeneuve.

Tribe OESTRINI.

- 1 (2) Clypeus strongly enlarged, shield-like, much wider than facial ridges, hairy (fig. 4P, c). Prosternal sclerite bare, but membrane (*m*) with a conspicuous tuft of setulose hairs (fig. 2s). Thorax densely punctulate, in the British species with four conspicuous glossy black longitudinal weals. R_5 open (fig. 4Q; or closed in margin) *Hypoderma* (p. 25).
- 2 (1) Clypeus narrow, much narrower than facial ridges, bare (fig. 4O, c). Prosternal sclerite hairy, membrane bare. Thorax with coarse sculpture and pustules, without glossy longitudinal weals. R_5 stalked (fig. 4R). Abdomen with sparse short hairs on small shining black tubercles; tergites with a shifting mottled pattern of blackish and silver-grey spots. Fig. 4O, R. 10-11.5 mm.

Larvae are deposited singly during flight near the nostrils, and they develop in the nasal and frontal (sometimes maxillary) cavities, of sheep (seldom of goat or man, where they have also been found in ear and eye, producing in the latter conjunctivitis which lasts for a few days). Symptoms in man are usually neither serious nor long-lasting, since the larva appears to be unable to reach the second instar in man. Kent to Cornwall to Gloucs. to Norfolk, Derby, Notts. Forth District. m.v., e.vi-b.ix. Sheep Nostril Fly.

Oestrus ovis Linnaeus.

Genus *Hypoderma* Latreille, 1825 = Warble flies.

The females attach their eggs to hairs of the host, especially on and near the legs, and the larvae penetrate the body at the base of the hair, wandering through the intermuscular connective tissues and forming at last on the back of the host a "warble" with an opening to the outside. The last two instars, which have no functional mouth-hooks, are spent in the warble, and the mature larva pupates on the ground. In man the eye is sometimes affected, with serious results. All three species are probably able to complete their development in man, and the symptoms are therefore much more severe than in infections by *Oestrus*.

KEY TO SPECIES.

- 1 (2) Second antennal segment black or piceous. Abdomen with moderately dense pale-yellow hair. Margin of scutellum (fig. 4s) with a deep median notch and a less deep notch on either side, thus forming four glossy black, very conspicuous lobes, since the hair is weakly developed. ♂: frons a quarter head-width; hind metatarsus shorter than the combined length of the next three segments. ♂: fig. 4r, s. 10-12 mm.
Normally in red deer and roe deer. Perth to Sutherland. b.-e.vi. Deerfly diana Brauer.
- 3 (1) Second antennal segment light brown to testaceous. Apex of abdomen with dense rufous-yellow fur, which contrasts with the dark hair of the intermediate part. Margin of scutellum with at most a very slight and broad median emargination (fig. 4t). ♂: frons a third head-width, metatarsus of hind leg about as long as the following three segments together. ♀: frons almost one-half head-width.
- 2 (4) Smaller and more slender. Hair of thorax almost uniformly yellowish grey to brown. Fig. 4q. 10.5-12 mm.
Normally in cattle, sometimes in horses, goats and even man, apparently more ready to infest abnormal hosts than bovis. Sussex to Devon to Brecknock to Suffolk, Notts. Outer Hebrides. Shetland Is. e.iv,m.v-e.vi
lineatum Villers.
- 4 (3) More bumble-bee-like. Anterior half of thorax with yellow hair which contrasts strongly with the fuscous-black hair of the posterior part. Fig. 4t. 12-14 mm.
In cattle, seldom in horses, goats and occasionally man. Surrey to Devon to Gloucs. to Suffolk, Derby, Lancs. Forth district. b.vi-e.vii
bovis Linnaeus.

Tribe PHASIINI.

All species (*Xysta*?) are parasites of Heteroptera, especially Pentatomidea, female hosts being apparently preferred. The egg is either stuck to the integument of the host (all British genera except *Alophora*) or injected through the integument by means of a piercer (*Alophora*). The mature larvae leave the host for pupation, and the bug often survives for some days. (Biology: Dupuis, 1947, *Ann. Paras. hum. comp.* 22: 201-232, 397-441; etc.)

KEY TO GENERA.

- 1 (8) Abdominal sutures distinct on dorsal and ventral surfaces (fig. 5A-C), abdomen more or less flattened, the edge more pronounced, tergites finely punctured.
- 2 (7) Abdomen with rather strong marginal setae, which are more than half as long as a segment (fig. 5A, B). R_5 narrowly open or closed in margin.
- 3 (4) Abdomen wholly dark in ground-colour. Densely, and second to fourth abdominal segments uniformly, grey dusted; thorax with five black vittae, the median three sometimes fused. Abdomen without discals but with marginals at least on the third and fourth segments (fig. 5B). Parafrontalia with a single row of inclinate setae and at most a few hairs closely adjacent (fig. 5F).

Halteres yellowish. ♂: Mid tibia without a distinct *av* seta; claws and pulvilli very long. 7-8 mm.

Hosts unknown. Dorset: *Hinton Admiral*; *Hants., Herts.: Felden*; *Cambs.: Kirtling and Woodditton Wood*; *Suffolk: Ipswich, Barton Mills and Worlington.* e.iv-m.vi ***Xysta cana* Meigen.**

4 (3) Abdomen largely brownish yellow.

5 (6) Legs and antennae black. Head and dorsal surface of thorax densely golden dusted; scutellum wholly fuscous-black in ground-colour. Occiput without black hair behind upper part of occipital row (fig. 5E). Basal part of wings orange. Apical abdominal segments and a median vitta infusate. ♂: frons one-fourth head-width at vertex. Fig. 5A and E. 4-6 mm.

Parasite of Eurydema (PENTATOMIDAE). Probably not British.

***Clytiomyia continua* Panzer.**

6 (5) Legs, except tarsi and to some extent apex of tibiae, yellow, as are palpi and antennae. Parafrontalia silver white dusted, thorax grey-dusted, rather dark, with an indication of three vittae; apex of scutellum yellow. A row of black hairs behind upper part of occipital row. Wings only slightly tinged. Abdomen with small transverse black lateral spots and, in male, 1-2 small spots on median line. ♂: frons one-seventh head-width at vertex. 4-5 mm.

Parasite of Elasmucha grisea L. (ACANTHOSOMIDAE). Hants.: Farley Down and Breamore. v, vi, ix ***Subelytia rotundiventris* Fallén.**

7 (2) Abdomen without distinct marginal setae (fig. 5C). *R*₅ stalked, stalk never much shorter than *r-m* (fig. 5K-M). ♀: ovipositor piercer-like, free, hardly exceeding apex of abdomen (fig. 5C, H-J); eyes subcontiguous as in male.

***Alophora* p. (27).**

8 (1) Abdominal sutures obsolete, abdomen subglobular (fig. 5D), tergites rather coarsely and scabrously punctured. *R*₅ petiolate, stalk shorter^{6a} than *r-m* (fig. 5N). Only 1 *spl.* Abdomen without setae but with fine short even hairs (fig. 5D); testaceous with a black median spot on each segment; interfrontalia dull orange, legs and ground-colour of thorax black. ♂: parafrontalia, upper part of parafacialia, and thorax to beyond suture golden dusted.

^{6a} Stalk twice as long as *r-m*, *R*₅ as in fig. 4E. Antennae about half length of face, third segment not much longer than wide. Glossy black, with dense pale dust on most of head, shoulders and pleurae. ♀: entirely black, dust whitish. ♂: abdomen much as in *Gymnosoma*, the rather broad parafrontalia and the anterior half of thorax densely golden dusted. 3.5-5mm. 1♀ *Portsmouth, S. Hants., 7.vi.54 (D. J. Clark !)*. 1♂: *St. Brelades, Jersey, 12.ix.46 (C.J. Wainwright !)*. *Parasite of Aelia. Cistogaster globosa* F.

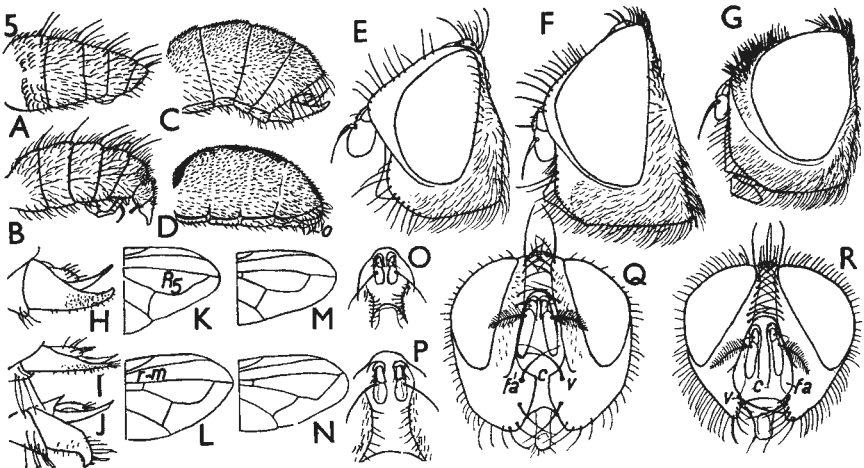


FIG. 5.

♀: ovipositor retractile, telescoped, but with sclerotized plate (fig. 5D, o); anterior half of parafrontalia pale golden dusted, posterior half and thorax glossy black, dusted about the shoulders. 4.5–8 mm. (*Rhodogyne* Meigen, 1800)

Parasite of most British PENTATOMIDAE, also attacking CYDNIDAE abroad. Sussex; Surrey; Hampstead, N. London. Co. Cork; Co. Kerry. vi-b.ix
***Gymnosoma rotundatum* Linnaeus.**

Genus *Alophora* Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (4) Parafrontalia setulose outwards to the (double) row of frontal setae (fig. 5G), which sometimes are not clearly differentiated from the setulae. Halteres yellowish. Thorax with some pale dust, especially at shoulders. ♀: ovipositor and its sheath upcurved at apex (fig. 5H and I).
- 2 (3) Stalk of R_5 about as long as $r-m$ (fig. 5K); bend of m more or less obtuse, often with the vestige of an appendage, apical cross-vein somewhat sinuate, its general direction running towards r_{4+5} at an angle of about 45° ; r_1 ending beyond level of $r-m$. Hair of pleurae and the basal part of hind femora reddish. Black with purplish reflections, abdomen to a varying extent yellowish at sides, the wings of the male as a rule considerably broadened, yellowish tinged, normally with a fuscous suffusion at apex, another along costa between h and apex of r_1 , and a third along m from base to apex of discal cell; wings of female of normal shape and only slightly yellowish tinged on basal anterior part. Fig. 5C, G, H, K and P. 8–12.5 mm. (Sbg. *Alophora* s. str.)
Hosts unknown. Sussex to Cornwall to Merioneth to Yorks. Co. Waterford, e. iv-b. viii **hemiptera** Fabricius.
- 3 (2) Stalk of R_5 almost twice as long as $r-m$ (fig. 5L); bend of m very strongly arched, apical cross-vein continuing the curve, not sinuate, joining r_{4+5} at an angle of about $70-80^\circ$; r_1 ending about at level of $r-m$. Hair of pleurae and the legs all black. Wholly black, abdomen with brassy reflections and thin grey dust, thorax with moderately dense whitish dust and four conspicuous black vittae; wings hyaline. Fig. 5I, L and O. 3–7 mm. (Sbg. *Hyalomyia* Robineau-Desvoidy, 1830.)
Hosts unknown. England. Scotland. Ireland. Generally distributed. e. iv-m. viii **obesa** Fabricius.
- 4 (1) Parafrontalia bare outwards to the (double) row of frontal setae, the latter well developed. Halteres fuscous. Thorax without any pale dust, thinly dark brown dusted. Stalk of R_5 several times the length of $r-m$ (fig. 5M); bend of m strongly arched. Hair of pleurae, body and legs all black; face whitish dusted, the last three abdominal segments in posterior view not very densely whitish dusted, with vestiges of a black median vitta; wings of male often smoky. ♀: ovipositor sheath strongly curved downward at apex, laterally compressed (fig. 5J). Fig. 5J and M. 2–5 mm. (Sbg. *Parallophora* Girschn., 1887.)
Parasite of Cydnus (CYDNIDAE) and Chilacis (LYGAEIDAE). Kent to Cornwall to Notts. Inverness. Channel Is. b. v-m. ix **pusilla** Meigen.

Subfamily DEXIINAE.

Tribe DEXIINI.

All species deposit fully incubated eggs or young larvae at places frequented by larvae of beetles, especially chafers. The young larvae burrow through the soil or frass in search of a host, into which they penetrate, probably through a spiracle. The mature larva abandons the host, sometimes not before the latter has pupated.

KEY TO GENERA.

- 1 (2) Vibrissa near middle of face (fig. 5Q, v), facial ridges (fa) at level of vibrissae almost supplanting clypeus (c), the latter reduced to a small oval excavate area, without a median keel and restricted to length of antenna. Arista densely plumose, not longer than third antennal segment, which is elongate

(fig. 6A). 3 *post dc*. Appendage of bend more than half as long as *m-m*; apical cross-vein and tip of r_{4+5} subparallel for a distance almost equal to length of appendage (fig. 6B). First abdominal segment without setae, second and third with marginals. Body fuscous-black with dense yellowish to greyish-golden dust, thorax with four conspicuous vittae; abdomen with broad dark hind margins; antennae, palpi and legs pale. Figs. 5Q, 6A and E. 8–13 mm. (Subtribe Dexiosomina.)

Parasite of cockchafer larvae (Melolontha). England. Scotland. Ireland. Common on bracken in semi-wooded places. b.vi–b.ix.

Dexiosoma caninum Fabricius.

- 2 (1) Vibrissae inserted less highly (fig. 5R, v), sometimes not differentiated. clypeus (c) not supplanted by the facial ridges (*fa*), conspicuous to mouth-margin.
- 3 (14) Hind tibiae (fig. 6G) with only two dorsal preapicals (except in ♂ *Atropidomyia*), with a distinct (though sometimes small) *pv* apical seta (fig. 6G, *pv*). Arista plumose, except in *Atropidomyia*, where it has, however, conspicuous half-erect hairs, which on intermediate third are about twice the length of its basal diameter. ♂: frons without proclinate orbital setae; ♀ with only two.
- 4 (5) Proboscis much longer than height of head, flexible (fig. 6I). Mouth-margin (fig. 6I, *m*) projecting between vibrissae, well visible in profile. Only 1–2 *post ia*. Bend of *m* obtuse, normally without the vestige of an appendage (fig. 6F). Facial keel long and broad, often with a shallow longitudinal furrow. Abdomen without discal setae, even the first segment normally with strong marginals (fig. 7A). Thorax fuscous with dense greyish-golden dust, head, antennae, palpi and legs testaceous. (= ? *Callirrhoe* Meigen, 1800) (Subtribe Prosenina) **Prosenia** (p. 29).
- 5 (4) Proboscis not longer than height of head (fig. 6J, *κ*); mouth-margin not projecting between vibrissae. (Subtribe Dexiina.)
- 6 (11) Propleural depression (fig. 6J, *p*) setulose (sometimes with only 1–2 black hairs!). Second and third abdominal segments without discal setae. Facial ridges not or hardly converging below (fig. 5R); vibrissae almost as widely separated as peristomal setae of anterior third of mouth margin. Ground-colour of abdomen wholly blackish.
- 7 (10) Apical scutellars strong, at least about two-thirds the length of the subapical ones (fig. 6M). Parafacialia bare (figs. 5R, 6J). First abdominal segment with marginals, except in ♀ *carinifrons*. Pollinosity greyish white; thorax with five vittae, the middle three linear but tending to coalesce; abdomen with shifting dark spots.

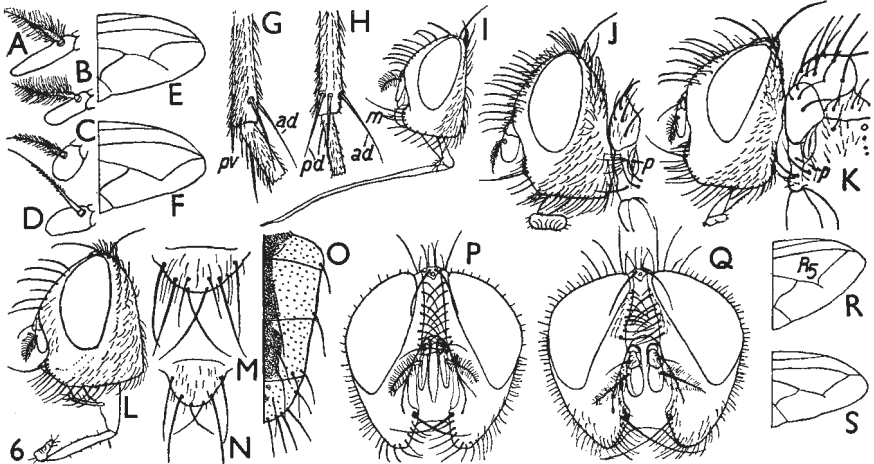


FIG. 6.

- 8 (9) Face with a broad and large median keel (fig. 5R). Vibrissal angles conspicuously produced, the length of the head at that point almost as great as the height; jowls bare and reddish on almost anterior half; parafrontalia almost bare on anterior half. The two posterior *ia* only present; 3 strong *post dc.* ♀: first tergite without marginals. Figs. 5R, 6B, c. 4.5–10 mm. (Sbg. *Myiocera* Robineau-Desvoidy, 1830.)
Hosts unknown, related species in larvae of LUCANIDAE, MELOLONTHINAE, CETONIINAE and CERAMBYCIDAE. England. Wales. Scotland. Hebrides. e.v-b.x. Billaea carinifrons Fallén.
- 9 (8) Face without a median keel, Vibrissal angles not much produced, head much higher than long (fig. 6J); jowls setulose and dark, except on anterior fourth; parafrontalia conspicuously setulose almost to anterior extremity. Three *post ia*; 4 strong *post dc.* ♀: first tergite with strong marginals. Fig. 6C, J, M. 7–9 mm. (“*smerinthis*” Meade, not ex *S[merinthus] populii* but ex *S[aperda] populnea*.)
Parasite of the larva of Saperda populnea L. (CERAMBYCIDAE). *Kent to Hants. to Worcs. to Oxon. Edinburgh. m.v, m.vii-m.viii.*
Atropidomyia irrorata Meigen.
- 10 (7) Apical scutellars small, up to about half as long as the subapical ones (fig. 6N). Parafacialia setulose, though often sparsely (fig. 6L). First abdominal segment without marginals (♂♀). *R*₅ normally closed in margin. Face with a weakly developed median keel. Vibrissal angles conspicuously produced and raised. Fuscous, anterior lower part of head brownish orange; densely cinereous dusted, thorax with four narrow vittae; abdomen evenly dusted; interfrontalia, base of antennae, palpi and legs pale testaceous, tarsi and often femora fuscous. Fig. 6L, N. 4.5–8.5 mm.
Parasite of larva of Harpalus (s. str.) sp. (aeneus ??; CARABIDAE) (!), an unnamed species recorded abroad as parasite of Serica larvae (MELOLONTHINAE). Kent to Cornwall to Pembs. to Ches. to Norfolk, Lancs. m.vi-e.viii
Dinera grisescens Fallén.
- 11 (6) Propleural depression bare (fig. 6K, p). Second and third abdominal segments (except usually in ♀ *D. rustica*) with discals (and marginals) (fig. 7B, c). Facial ridges strongly converging below (fig. 6P, q); vibrissae much less widely separated than the peristomal setae of the anterior third of mouth margin (except in *Estheria cristata*).
- 12 (13) *R*₅ (normally) open. Clypeus with a long and well defined longitudinal keel, which exceeds apex of antennae (fig. 6P). Notopleura (see fig. 1B and G, n) bare between and behind the two setae. Femora testaceous. 3 *post dc.* Ground-colour of abdomen testaceous in male (figs. 6 o, 7B) with a more or less complete median vitta, blackish in female. **Dexia** (p. 30).
- 13 (12) *R*₅ shortly petiolate (fig. 6R, s). Clypeus with a very low and ill-defined longitudinal keel (fig. 6Q), which does not reach apex of antennae. Notopleura setulose between and behind the two setae. Femora fuscous-black. Ground colour of abdomen (fig. 7c) wholly fuscous-black, covered by very conspicuous grey dust which forms more or less distinct shifting spots (♂♀).
Hosts unknown. Estheria (p. 31).
- 14 (3) Hind tibiae with three subequal dorsal preapicals (fig. 6H), and without a *pv* apical seta. Arista appearing bare, the hairs being decumbent and hardly half the length of its basal diameter (fig. 6D). Propleural depression bare (see fig. 6K, p). Bend of *m* with a distinct appendage (fig. 7F). Stoutish species with short-ovate abdomen. (Subtribe *Trixina*.)
Hosts unknown; females depositing living larvae in circumstances which point to Scarabaeid larvae as probable hosts Trixa (p. 31).

Genus *Prosenia* Lepelletier & Serville, 1828.

KEY TO SPECIES.

- 1 (2) Abdomen not uniformly grey-dusted, in male largely testaceous with a moderately broad fuscous median vitta and fuscous apex, the testaceous parts only thinly cinereous dusted, in female fuscous, densely grey dusted with dark brown dust about the marginals and often along the whole of the hind

margins. ♂: some of the hair on disc of thorax yellowish, especially near suture. Figs. 6F, I, 7A. 7.5-10.5 mm.

Parasitizes abroad the larvae of various Sericini, Melolonthini and Anomaliini (SCARABAEIDAE). Surrey to Dorset to Caern. to Yorks. S. Ireland. Common locally. b.vii-e.viii, b.x. siberita Fabricius.

- 2 (1) Abdomen uniformly grey-dusted, in male not or very slightly testaceous at sides, in female without dark brown dust. ♂: hair on disc of thorax all black. 6-8 mm. (Perhaps only a variation of *siberita*.)

Kent: Farningham; Hants.: Farley; Dorset: Whitcombe Downs; Herts.: Tring; Cambs.: Devil's Ditch. Local on downlands. b.v, b.vii-m, viii. luculliana Rondani.

Genus *Dexia* Meigen, 1826.

- 1 (2) Abdomen (fig. 7B) with a distinct undusted or dark-dusted band on hind margin of each segment, the third and fourth segments of male with a narrow piceous hind margin, the dark median vitta hardly noticeable to the naked eye. Normally 1 *ph*, 1 + 1 *stpl*, only two (the two posterior) *post ia*, and 1 + 1 *acr*. Pruinosity evenly cinereous grey to golden yellow, paramedian vittae of thorax almost reaching middle between first and second *post dc*. ♀: with discals on intermediate abdominal segments. ♂: figs. 2k, 6P, 7B. 6.5-10.5 mm.

Parasite of larvae of Melolontha and probably of other Melolonthinae. England. Wales. Scotland. Generally distributed. b.iv, m.vii-e.viii, m.x vacua Fallén.

- 2 (1) Abdomen (fig. 6 o) without contrasting hind margins, the pale pollinosity being almost evenly distributed on disc from base to hind margin, the ground-colour in male without piceous hind margins but with the dark median vitta rather conspicuous to the naked eye. Normally 2-3 *ph*, 2 + 1 *stpl*, 3 *post ia* and more than 1 + 1 strong *acr*. Paramedian vittae of thorax hardly exceeding the first *post dc*. ♀: usually without discals on abdominal segments. ♂: fig. 6o; ♀ fig. 1m. 7-12 mm.

Parasite of larvae of Melolontha, Amphimallon and probably Serica and other Melolonthinae. (Biology: Walker, Proc. zool. Soc. Lond. (A) 1943: 126.) Surrey to Cornwall to Merioneth to Notts. to Norfolk. b.vii-e.viii. rustica Fabricius.

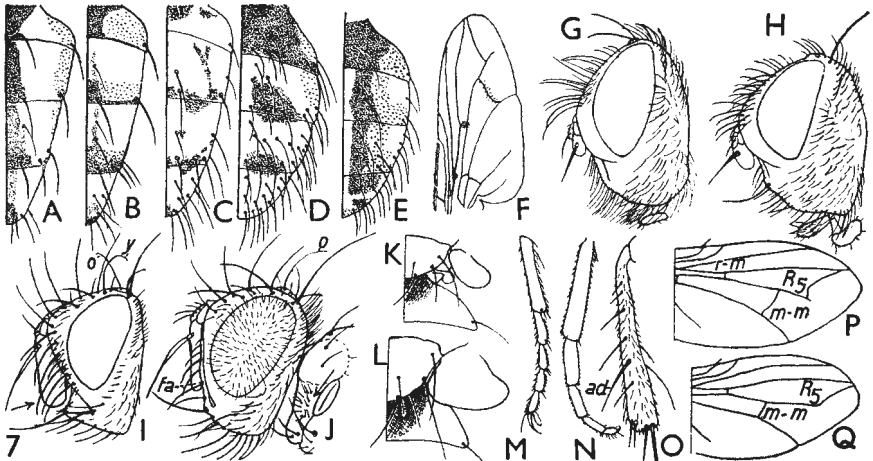


FIG. 7.

Genus *Estheria* Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (2) Three *post dc* (see fig. 10G). Stalk of R_5 markedly shorter than $r-m$ (fig. 6R). Scutellum rufous. Abdomen with conspicuous shifting blackish spots, which in posterior view occupy more than half the length of the segments on one side. Parafrontalia, parafacialia, occiput, thorax but for scutellum, legs but for tibiae, and abdomen fuscous-black with conspicuous cinereous dust. ♂: fig. 6K and R. 8·5–10·5 mm.
Kent to Hants. to Hereford to Norfolk. b.vii–b.ix. *cristata* Meigen.
- 2 (1) Four *post dc* (see fig. 10H). Stalk of R_5 almost twice as long as $r-m$ (fig. 6S). Ground-colour of scutellum fuscous-black like that of the thorax, coloration otherwise as in *cristata*, but abdomen (fig. 7C) almost evenly dusted with only a few slight less extended and easily overlooked shifting spots. ♂: figs. 6Q, S, 7C. 7·5–9·5 mm.
Only British record: Sutherland, 1877 *bohemani* Rondani.

Genus *Trixa* Meigen, 1824.

- 1 (2) Transverse veins and node at base of r_{4+5} conspicuously infusate (fig. 7F). Femora dark brown to black but for the apex. Vibrissa conspicuous (fig. 7H). Abdomen in male (fig. 7E) with testaceous sides, thorax with four interrupted black vittae on the white-dusted ground, the pattern shifting in very small units; abdomen, if the light comes from in front, with a more densely white-dusted narrow median vitta and with a more or less undusted broad band on hind margin. ♂♀: parafrontalia with numerous proclinate orbital setae, similar to the inclinate frontals. ♂: figs. 6H, 7E, F, H. ♀: fig. 6D. 8–13 mm.
England. Scotland. Wales. Generally distributed. b.v–m.ix
ostroidea Robineau-Desvoidy.
- 2 (1) Transverse veins and node not infusate though all veins are somewhat yellowish suffused. Femora reddish yellow, but often infusate along dorsal surface. Vibrissa not differentiated (fig. 7G). Ground-colour black, shoulders and apex of scutellum more or less ferruginous translucent; thoracic vittae as in *ostroidea*, but reflections hardly shifting, testaceous sides of male abdomen (fig. 7D) much narrower, more indented, more dusted and therefore much less conspicuous; the dark transverse bands (♂♀) rather broadly interrupted on median line. ♂: parafrontalia with fine setulose hairs only, much finer and shorter than the inclinate frontals. ♂: fig. 7D and G. 8·5–13 mm. (= *alpina* Meigen of authors, nec Meigen.)
Kent to Hants. to Hereford to Oxon. m.iv–m.vi. . . . *coerulescens* Meigen.

Subfamily MACQUARTIINAE.

KEY TO TRIBES.

- 1 (46) Mouth-margin not projecting between vibrissae if viewed in profile (fig. 7I, J), very seldom distinctly projecting (*Stenoparia*), in this case the basal dorsal excavation of the abdomen not exceeding middle of first segment (fig. 7K), the parafacialia wholly setulose (fig. 10Q), the mid tibia with only one *ad* seta, and *m* ending virtually at wing-tip (fig. 10S). Not fuscous with red-tipped abdomen (i.e., fourth tergite in ♀ and hypopygium in ♂ red) and scutellum, if the frontal setae descend below level of arista.
- 2 (15) Fore tarsi not, or not strikingly, compressed laterally (fig. 7M); if they are somewhat compressed, the single segments somewhat broadened apically, with conspicuous setulose hairs.
- 3 (10) Occiput with numerous black setulae (fig. 7I) behind upper half of occipital row.⁷

⁷ But see *Graphogaster fasciata* ♀, which may trace here: r_1 bare, R_5 with a long stalk, antennae, legs, etc., largely orange.

- 4 (5) Basal excavation of abdomen not or hardly exceeding middle (fig. 7κ), except sometimes when (in British species) the inner margin of the lower calyptra is strongly convex and diverging posteriorly from the longitudinal axis of the fly (fig. 9L). Mid tibia with two or more strong *ad* setae (fig. 7o), or, if with only 0-1, tibiae black. Scutellum (fig. 7κ, λ) without erect discal setae on basal half, as a rule with only 1-2 pairs of strong marginals (in addition to any decussate apicals); if with three pairs, the hind tibiae with three practically equal *d* (i.e., *ad*, *d* and *pd*) preapicals or R_5 with a long stalk (fig. 7p). Prosternum bare⁸, except sometimes in *Pelatachina*. MACQUARTINI (p. 34).
- 5 (4) Basal dorsal excavation of abdomen reaching or virtually reaching hind margin (fig. 7λ), less often not or hardly exceeding middle; in these latter cases either the mid tibiae yellow and with only 0-1 *ad*, or the scutellum with some erect discal setae on basal half (fig. 9v, w) and the parafacialia with a row of strong setae (fig. 7ι). Lower calyptra of normal structure, the inner margin closely adjacent to margin of scutellum and converging posteriorly with longitudinal axis of fly (fig. 7L).
- 6 (9) Subapical seta of scutellum weak or absent; lateral seta strong, the distal one of the strong setae (apart from the apical ones) therefore almost or fully as distant from apex as from base of scutellum (fig. 9v, w).⁹ Mid tibia with one or more *ad* setae. Palpi well developed.
- 7 (8) Facial ridges bare or with only some fine, downward-curved setulae on lower part. Parafacialia with a row of strong setae, which are curved downward (fig. 7ι, ↑). Ocellars proclinate (fig. 7ι, o). Propleural depression bare. Bend of *m* with a short appendage; *m-m* joining *m* at right angles¹⁰; R_5 stalked.

⁸ Prosternum with at least one pair of black bristles, and reclinate upper frontals well developed. Scutellum with three pairs of strong marginals. Hind tibia with 2-3 *d* preapicals and a small *pv* apical spur. See *Trichopareia*, p. 62.

⁹ The apical (?) scutellars very strong and diverging, the subapical ones as under 6; bend of *m* with an appendage, apical cross-vein ending well before wing-tip, the whole fly bright metallic green or blue, very seldom purple black; see *Gymnochaeta* (Ernestina), with only slightly projecting mouth margin.

¹⁰ *m-m* very oblique, even more so than apical cross-vein (fig. 16f), the upper distal angle of the discal cell therefore acute; bend of *m* prolonged by a darkened fold or an appendage. Two reclinate frontal setae present (fig. 21g, h, i), which are not differentiated in *Wagneriini*. Occiput without black setulae behind upper half of occipital row. See *VORINI*, p. 68.

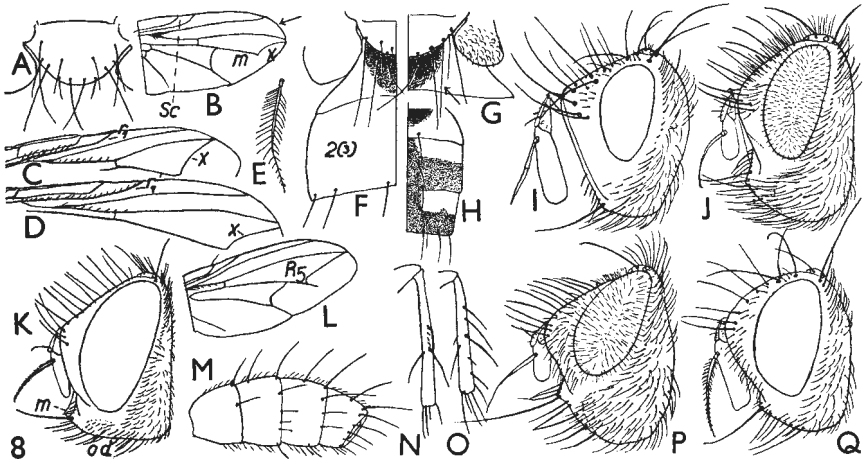


FIG. 8.

- Occiput with numerous black setulae on upper half. Eyes bare (in British species). Frons very broad in both sexes. WAGNERINI (p. 39)
- 8 (7) Facial ridges with strong and subequal setae which extend high up; these setae are long and suberect (fig. 7j). Parafacialia at the most with some setulae on upper part. Ocellars reclinate (fig. 7j, o). Propleural depression with pale setulose hairs (fig. 7j, \uparrow). Bend of *m* not prolonged; apical cross vein almost straight; *R*₅ open or closed in margin; *m-m* slightly oblique (fig. 7q, *m-m*). Occiput with numerous black setulae on upper half. Eyes hairy. ♂: frons narrow CAMPYLOCHAETINI (p. 40)
- 9 (6) Scutellum almost always with at least three pairs of strong marginals at sides (see fig. 9A), the second and third diverging (usually in addition to a pair of apical setae), the most distal of these diverging setae never much more than half as distant (and often less) from apex as from base (fig. 6A); if with only two pairs of strong marginals (fig. 8A), the mid tibia without an *ad* seta and the palpi vestigial. Apical cross-vein ending almost in wing tip, from which its apex is separated by not or little more than length of *r-m* (except in *Loewia*); costal sector (fig. 8B, \uparrow) between apices of r_{2+3} and r_{4+5} much longer than *Sc*, except in *Hyalurgus*; bend of *m* without an appendage or fold. HELOCERINI (p. 41)
- 10 (3) Occiput with only or almost only pale hair behind occipital row (fig. 8r, j). Subbasal and subapical marginals of scutellum strong, the latter closer to apex than to base (fig. 8F, g). Apical cross-vein ending well before wing tip, from which it is separated by considerably more than length of *r-m* (fig. 8c, d). Mid tibiae with several strong *ad* setae (see figs. 7o, 8o).
- 11 (14) r_1 setulose on dorsal surface (fig. 8c, d). Lateral scutellars absent or weak (fig. 8F). Eyes bare. Lower calyptra bare.
- 12 (13) Arista bare (pollinose), geniculate, the first segment very short, the second elongate and subequal to the third (fig. 8i). r_1 setulose (fig. 8c) on middle section only (i.e., between levels of *h* and apex of *sc*). *pv* apical spur of hind tibia well developed (see fig. 2E). First tergite without marginals, second without discals (fig. 8F). Facial ridges bristled on lower third or more (fig. 8i). First *post ia* absent. Scutellum with a pair of conspicuous diverging preapical discals just in front of the cruciate apicals (fig. 8F). Frons at vertex much wider than an eye (♂♀). GERMARINI (p. 44)
- 13 (12) Arista plumose, not geniculate, the basal two segments short (fig. 8E). r_1 setulose on middle and, to a less extent, apical sections (fig. 8D); r_{4+5} setulose to about *r-m*. *pv* apical spur of hind tibia absent (see fig. 2F); legs long and slender. First tergite with strong marginals, second and third with discals and marginals (fig. 8H). Facial ridges with some fine setulae on lower fourth only, in addition to a seta just above the vibrissa. First *post ia* strong. Frons at vertex (in ♂ much) narrower than an eye. Fuscous-black, in male the lateral part of the anterior three abdominal segments broadly testaceous or brownish translucent; thorax, apart from four vittae in front and three broad ones behind, and transverse bands on the tergites silver-white dusted. Fig. 8D, E, H. 7.5-12 mm. (= *leucozoma* Panz.).
- Parasite of caterpillars of larger HETEROCERA (SPHINGIDAE, NOTODONTIDAE, LASIOCAMPIDAE, AGROTIDAE and especially ARCTIDAE), on which the females deposit fully incubated eggs. Generally distributed in England, Wales, W. and S. Ireland. b.v-m.ix... THELAIRINI: Thelaira nigripes F.*
- 14 (11) r_1 bare on dorsal surface. Lateral scutellars strong (fig. 8g, \uparrow). Eyes densely hairy.¹¹ Lower calyptra hairy on dorsal surface (fig. 8G). Arista bare (pollinose), the first two segments short and inconspicuous (fig. 8j); antennae inserted below middle of eyes, slender but only about as long as height of jowls, which is well over half as long as greater diameter of the eye. First tergite without marginals, second and third without discals. Fuscous-black with pale palpi, tip of scutellum (in male more extended) and lateral part of male abdomen. ♂: vertex less than one-fifth, ♀ not much more than one-quarter head-width. ♂: fig. 8g, j. Length 11-15 mm.

¹¹ Eyes bare. Lower calyptra bare. Second segment of arista very long, arista elbowed. Prosteronum setose: *Gonia*, which in spite of a *pv* apical seta on the hind tibia is considered to be related to Carceliini, etc., see p. 75.

Parasite of Spilosoma lubricipeda L. (ARCTIIDAE), Amphidasis betularia L. (GEOMETRIDAE) and various AGROTIDAE. Sussex: Guestling, Hastings, 1886; Hants.: New Forest, I.vii.07 and viii.15; Micheldever 29.viii.52 (C. H. Andrewes!). NEMORAEINI: Nemoraea pellucida Meigen.

- 15 (2) Fore tarsi conspicuously laterally compressed, the segments band-shaped, not dilated to apices and with very short and fine setulae (fig. 7N); claws very small. R_2 closed in margin or with a short stalk (fig. 8L); r_1 bare: r_{4+5} setulose to about $r-m$. Arista pubescent (fig. 1L). Abdomen strikingly compressed laterally (a distinctive character!), first segment with strong marginals, the others with strong discals and marginals (fig. 8M). Elongate flies with long and slender legs. Thorax with a median vitta of whitish dust flanked by moderately broad black vittae. The British form with a well-developed costal spine (fig. 8L), and on the abdomen with a complete broad black median vitta. ♂: frons at vertex about one-fifth head width. ♂: figs. 1L, 7N, 8L, M. 7-9 mm.

Parasite of Pyralis glaucalis L. (PYRALIDAE). Kent to Sussex to Oxon. to Norfolk. m.v, b.vi-m.ix

MINTHOINI: *Mintho rufiventris lacera* Rondani.

- 16 (1) Mouth margin (fig. 8K, m) distinctly projecting between the vibrissae (very slightly in *Gymnochaeta*—bright metallic—and *Micronychia*—with red-tipped fourth tergite of female and red hypopygium in male, red-tipped scutellum and descending frontals which exceed level of arista). If the basal dorsal excavation of the abdomen does not exceed the middle of the first segment either the mid tibia with only one *ad* seta and the parafacialia bare, or the mid-tibia with several *ad* setae and *m* ending well before wing tip (by more than length of $r-m$). Facial ridges bare or only with odd downward-curved setulae near vibrissa.¹² Jowls with a very distinct occipital dilation (fig. 8K, *ad*). Ocellars proclinate (or absent). Subapical setae of scutellum (fig. 12L, m) strong, much closer to apex than to base, apical ones as a rule (not in the metallic green *Gymnochaeta*) smaller and cruciate or failing.
- 17 (18) Mid tibia with only one *ad* seta (fig. 8N). Basal dorsal excavation of abdomen not or hardly exceeding middle (see fig. 8E). Antennae elongate (fig. 8K).¹³ *pv* apical seta of hind tibia small or indistinct (see fig. 2F). Scutellum without cruciate apicals, lateral almost always absent or indistinct. First to fourth tergites with marginals but without discals. Elongate flies with long and slender legs. LESKIINI (p. 44).
- 18 (17) Mid tibia with two or more strong *ad* setae (fig. 8O) Basal dorsal excavation of first abdominal segment (fig. 12L, m) as a rule almost or fully reaching hind margin (exception some Aphriina). *pv* apical seta of hind tibia (see fig. 2E) well developed except in some Aphriina. ECHINOMYIINI (p. 45).

Tribe MACQUARTIINI.

- 1 (8) Antennae short (fig. 9M-Q), third segment less than twice as long as second or (*Blepharomyia* ♂) occipital dilation present (fig. 9c) and hind tibia with only two *d* preapicals (see fig. 12s). Arista very finely pubescent or only pollinose. $m-m$ at middle or closer to bend than to $r-m$ (fig. 1H), rather oblique; R_2 not stalked (if closer to $r-m$ than to bend, or if R_2 is long-stalked (fig. 4C-E), see Dufourini, p. 21. (Subtribe MACQUARTIINA).
- 2 (5) Scutellum with only two pairs of strong diverging marginals in addition to the cruciate apical pair (fig. 9J, K, L), the distal ones not or only slightly more

¹² Facial ridges with setae ascending to at least middle (fig. 26q). Reclinate upper frontals distinct. Prosternum with one or more pairs of black bristles. Arista short and thick. Hind tibia with a small *pv* apical spur. See *Brachychaeta*, p. 81.

¹³ Antennae short and small (fig. 5F). Scutellum with cruciate apicals. Parafacialia bare. Basal dorsal excavation of abdomen not exceeding middle of first segment. Body short and stout: see *Xysta* (Phasiini) of which I have seen a specimen with two *post ia* placed rather close together.

distant from base than from apex. Occipital dilation large, broad and rounded in front (fig. 9c, N, o). Eyes densely hairy in male, sparsely so in female. Hind tibia with two or three *d* preapicals; in the latter case the intermediate one much smaller.

- 3 (4) Parafacialia bare or setulose (figs. 8p, 9N, o). Distal pair of diverging marginals of scutellum almost always more distant from apex of scutellum than from base. Hind tibia with a conspicuous *pv* apical seta and with 2-3 *d* preapicals. ♂: frons at narrowest part less wide than third antennal segment (fig. 9M, P, q); claws longer than fifth tarsal segment. **Macquartia** (p. 36).
- 4 (3) Parafacialia with a row of strong setae (fig. 9c). Distal pair of diverging marginals of scutellum as distant from base as from apex or slightly closer to the latter. Hind tibia without a *pv* apical seta and with only two *d* preapicals. ♂: frons (fig. 9R, s) at narrowest part more than a quarter head-width (in British species); claws shorter than fifth tarsal segment.

Blepharomyia (p. 38).

- 5 (2) Scutellum (fig. 9A, B) with three pairs of strong diverging marginals (and with or without strong cruciate apicals), the distal ones less than half as distant from apex as from base. Occipital dilation absent or narrow and triangular (fig. 9D, E, od). Eyes sparsely long-haired (♂), sparsely short-haired (♀), or bare. Hind tibia with three very strong and almost equal *d* preapicals (*ad*, *d* and *pd*).
- 6 (7) Eyes sparsely but quite distinctly haired (fig. 9D). Apical scutellars present and rather strong (fig. 9A). First abdominal segment without marginals; second and third each with a pair of strong discals rather close to base (fig. 9F). Base of r_{4+5} with several small setulae. Occipital dilation absent (fig. 9D). 0 + 1 *acr*. Hind tibia with a strong *pv* apical seta (see fig. 12s). Largely glossy black, abdomen appearing undusted, thorax towards neck with linear paramedian and broader outer vittae. Base of wings and calyptrae orange. Tibiae black. ♂: frons more than a third head-width, with a praevertical and usually two proclinate (the upper one mainly outwardly bent) setae. ♂: fig. 9A, F, D. 8-10.5 mm.

Sussex to Cornwall to Merioneth to Suffolk. Edinburgh. Channel Is. Probably more widely distributed. e.v-e.vi, e.vii.

- 7 (6) Eyes bare (fig. 9E). Apical scutellars absent (fig. 9B). First abdominal segment with strong marginals (fig. 9B); second and third with several pairs of somewhat irregular discals (fig. 9G). Base of r_{4+5} with a rather strong seta and sometimes a smaller one basad close to it. Occipital dilation conspicuous, triangular. 2 + 2 *acr*. Hind tibia without a *pv* apical seta (see fig. 2F). Dull blackish grey, abdomen moderately densely whitish dusted with black hind margins, thorax with three broad undusted vittae. Wings somewhat smoky, base less orange and hardly so beyond *h*; calyptrae largely greyish white. Tibiae reddish translucent. ♂: frons not quite a quarter head width, without praevertical or proclinate orbitals. ♂: fig. 9B, E, G. 6.5-8.5 mm.

Parasite of Lycophotia porphyrea Schiff., Mamestra oleracea L., etc. (AGROTIDAE), Aegeria tipuliformis Clerck (SESIIDAE) and especially Vanessa s. l. (also once recorded from Saperda, COL. CERAMBYCIDAE, LAMIINAE, in which case Sciapteron tabaniforme Rott. may have been the host); pupating in the ground. England. Scotland. Generally distributed. b.v-e.vi.

Pelatachina tibialis Fallén.

- 8 (1) Antennae very long, third segment at least thrice as long as second, arista short-plumose, the longest hairs about twice as long as its basal diameter (fig. 8q). Head long, without an occipital dilation. Hind tibia with three subequal strong *d* preapicals. Eyes bare. Parafacialia entirely setulose. Abdomen with discals and marginals (largely in a row) on first to fourth segments. Very slender, abdomen elongate, fusiform; glossy black, shoulders, notopleurae, pleurae and abdominal segments 2-4 anteriorly rather densely silver white dusted. ♂♀: frons at vertex less than a third head width, with a praevertical and normally two proclinate orbital setae. ♂: fig. 8q. 6.5-9.5 mm. (Subtribe PHYLLOMYIINA.)

Hosts unknown. Sussex to Cornwall to Perth. b.vi-e.viii, runs about leafage, vibrating wings, and appearing like a fossorial Hymenopteron

Phylomyia volvulus F.

Genus *Macquartia* Robineau-Desvoidy, 1830.

The females are believed to deposit fully incubated eggs or newly hatched larvae in the vicinity of the hosts, larvae of CHRYSOMELINÆ (*Chrysomela*, *Phytodecta*, probably *Melasoma*, etc.). Sometimes the parasite emerges only after pupation of the host. There is an unconfirmed report of a moth-larva serving as a host.

- 1 (8) Inner margin of lower calyptra broadly convex and diverging backward from longitudinal axis of fly and margin of scutellum (fig. 9J, L).
- 2 (3) Basal dorsal excavation of abdomen almost absent (fig. 9J); abdomen densely covered by cinereous-grey pollinosity with small shifting darker olive-grey spots; in certain directions the pollinosity appears divided on median line into a darker and a lighter part. Parafacialia setulose on about upper half (fig. 9H). 3 *post dc* (see fig. 10G). Arista with short hairs, the longest at least half as long as its basal diameter (fig. 9H). Thorax rather densely cinereous-grey dusted, the paramedian vittae narrow in front, the outer ones rather broad. Halteres and basicosta orange. Fig. 9H, J. 5.5-8 mm. (Sbg. *Cleonice* Robineau-Desvoidy, 1863.)

Parasite of Chrysomela fastuosa Scop. and sanguinolenta L. Kent to Cornwall to Salop to Suffolk, Lancs. (Witherslack). e.iv-m.vi, b.vii-e.x, woods and heaths *grisea* Fallén.

- 3 (2) Basal dorsal excavation of abdomen (normally) well developed (fig. 9K, L), at least closely approaching middle of first segment (if indistinct the arista only pollinose); abdomen more thinly dusted, glossy and without small shifting dark spots. Parafacialia bare,¹⁴ except for few setulae close to the frontal setae (fig. 9J, N). Arista only pollinose, or 4 strong *post dc* present.
- 4 (7) Halteres yellowish. Basicosta orange, except in ♂ *buccalis*. Frontal setae forming a single row (fig. 9I), though one strong seta may lie slightly outwards near anterior end.
- 5 (6) Basal dorsal excavation of abdomen almost reaching hind margin of first segment (fig. 9L); the latter without marginals. Normally 4 strong *post dc* (see fig. 10H). Arista with distinct short hairs, the longest about as long as

¹⁴ Parafacialia conspicuously setulose on more than upper half. Arista with very short hairs on basal half, the longest ones being about half the length of its basal diameter. 3 strong *post dc*. Otherwise as under 3(2). *Macroprosopa atrata* Fln., which is almost certainly not British.

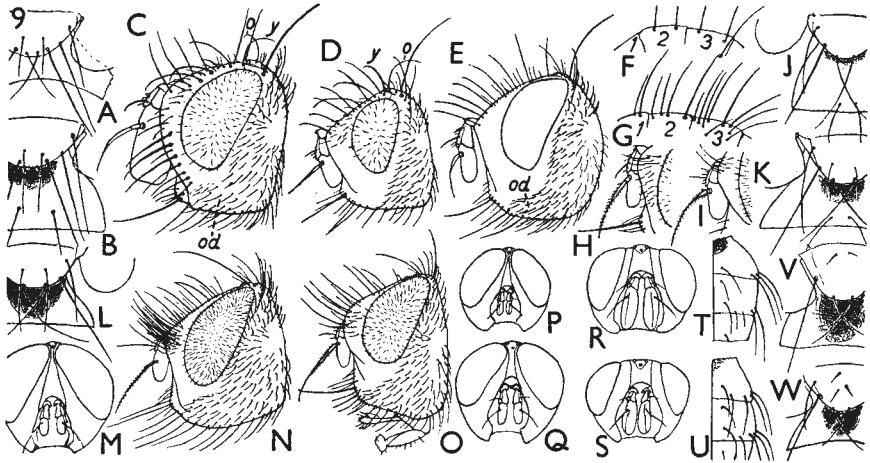


FIG. 9.

its basal diameter (fig. 9r). Costal spine small or indistinct. Basicosta and palpi bright orange. Paramedian vittae of thorax well defined; abdomen thinly dusted with a brassy tinge, marginal bands absent. Figs. 1h, 9i, l. 5-7.5 mm.

Bred abroad from larva of Chrysomela aurata Suffrian. Kent to Somerset to Inverness to Moray. b. iv, e. iv-b. ix, woods and marshes. . . nubilis Rondani.

- 6 (5) Basal dorsal excavation of abdomen not exceeding middle of first segment, the latter with marginals (see fig. 9k). 3 post dc (see fig. 10a). Arista only pollinose, the pile not longer than on third antennal segment. Costal spine well developed. Basicosta and palpi dark brown to fuscous in male, orange or light brown in female. Paramedian vittae of thorax ill-defined in male, distinct in female; abdomen not very thickly whitish grey dusted with slight brassy reflections only on a median vitta and well developed hind marginal bands. 5-7 mm.
- Gloucs. : Blaise Castle ; Coombe Dingle ; Worcs. : Wyre Forest. Perth to Sutherland. m. v-e. vi, e. viii buccalis Robineau-Desvoidy.*
- 7 (4) Halteres infusate. Basicosta black. Parafrontalia with strong frontal bristles arranged anteriorly in several rows and thus forming a bunch, especially in male (fig. 9N). Basal dorsal excavation of abdomen reaching about middle. 3 post dc. Arista hardly more than pollinose. Costal spine longer than r-m. Palpi fuscous. Bluish black with thin whitish-grey dust; abdomen without a pattern, thinly dusted in male, virtually undusted in female; first segment without or with (some males) marginals. ♂: figs. 7k, 9N. 5.5-8 mm. (= *spinicosta* Meade, = *pacifica* Meigen of Stein).
- Parasite of larva of Chrysomela varians Schall. and presumably the pupa of Melasoma tremulae F. Kent to Devon to Hereford to Norfolk, Lancs. (Holker Moss); map p. 6. e. v-e. vi, m. vii-m. ix, woods and marshes. praefica Meigen.*
- 8 (1) Inner margin of lower calyptra almost straight from base to about middle of scutellum (fig. 9k) and closely adjacent to margin of latter, conspicuously converging with longitudinal axis of fly from base to apex, the apical margin less rounded, almost truncate. Parafacialia setulose at least on upper third (fig. 9o). 3 post dc. Basal dorsal excavation of abdomen reaching about middle (fig. 9k).
- 9 (12) Tibiae and often femora yellow. Parafacialia wholly, and in male richly, setulose (fig. 8P). Palpi orange. First abdominal segment in male with, in female with or without, marginals. ♂: abdomen moderately densely whitish grey dusted, the disc with some brown dust and brassy reflections. ♀: densely grey dusted; second antennal segment, femora, epaulet and basicosta orange.
- 10 (11) ♂: Second antennal segment, femora, epaulet and basicosta fuscous; eyes almost contiguous (fig. 9P); thorax virtually undusted, except at shoulders and notopleurae, without distinct vittae, except near neck. ♀ very dissimilar in general appearance, densely dusted. ♂: fig. 8P. 6-9 mm.
- Parasite of Chrysomela sanguinolenta L. Kent to Cornwall to Worcs. to Suffolk. e. iv-e. vi, b. viii-b. x, woods and hedgerows. dispar Fallén.*
- 11 (10) ♂: Second antennal segment, (femora), epaulet, and basicosta orange as in female; eyes separated by more than half width of third antennal segment (fig. 9q); thorax more densely whitish dusted with four conspicuous undusted vittae in front. ♀: pollinosity of thorax similar to that of male, i.e., less dense and less extended than in *dispar*; abdomen with large glossy brassy black spots. 6.4-12 mm. (♂); 9 mm. (♀).
- Sussex to Devon to Hereford to Suffolk. b. -m. iv, (e. vi) . . flavipes Meigen.*
- 12 (9) Tibiae and femora fuscous-black. Parafacialia setulose on upper half or third (fig. 9o). Epaulet fuscous, basicosta and halteres orange.
- 13 (14) First abdominal segment without marginals, abdomen rather conspicuously dusted, even on first segment, disc with brassy reflections. Palpi orange. ♂: eyes subcontiguous. 8-8.5 mm.
- Parasite of Chrysomela varians Schall. Not British. . . chalconota Meigen.*
- 14 (13) First abdominal segment with marginals, abdomen less densely dusted, especially on disc and on first segment. Palpi variable. ♂: frons reduced to a fine line at narrowest part, where the interfrontalia disappear (in ab. *nitida* Zetterstedt slightly wider, as in fig. 9M, more dilated anteriorly, the interfrontalia remaining distinct in their whole length). ♀: frons less than one-

third head-width at vertex, moderately dilated anteriorly (in ab. *nitida* somewhat more dilated anteriorly). ♂: fig. 9k, m, o. 5-9 mm. According to Villeneuve only variations of *M. chalconota*.

Parasite of the larvae of Chrysomela fastuosa Scop., graminis L. (!) and varians Schall. Generally distributed, England, Wales, Scotland (to Inverness). m.iv (copula!)—e.x, woods and marshes.....tenebricosa Meigen.

Genus **Blepharomyia** Brauer & Bergenstamm, 1889.

- 1 (2) Frons (fig. 9R) not (♂) or just (♀) a third head-width at vertex, moderately dilated forward; distance between anterior "angles" of eyes (in dorsal view of the fly) less than half head-width; the proclinate orbital setae rather gradually merged into the row of proclinate parafrontal setulae. Marginal rows of first and second abdominal segments (fig. 9x) weakly developed between median and lateral marginals. Pale pollinosity largely silver grey, parafacialia without shifting spots. ♂: fig. 9R, r. 5-6.5 mm. (= *incerta* Meade).

Parasite of Bapta temerata Schiff., Opisthograptis luteolata L. and Hybernia marginaria F. (GEOMETRIDAE). Generally distributed, England, Wales, Scotland (to Moray). m.iv-e.vii, e.viii.....amplicornis Zetterstedt.

- 2 (1) Frons (fig. 9s) well over a third head-width at vertex (♂♀), strongly dilated forward, the distance between anterior "angles" of eyes more than half head-width; proclinate orbital setae strong and more clearly differentiated. Marginal rows of second and third abdominal segments strongly developed (fig. 9v). Pale pollinosity brownish grey, parafacialia and parafrontalia with shifting fuscous reflections, which are indented or interrupted by pale dots and by a large spot on parafacialia. Like *amplicornis* fuscous-black with moderately dense pollinosity; thorax with two pairs of vittae; intermediate abdominal segments with a pair of large half-moon-shaped dark spots on hind margin, sometimes only a narrow front margin and anterior angles pale dusted. ♂: fig. 9c, s, v. 4-5-6 mm.

Hosts unknown. Perth: Loch Katrine; Callander; Inverness: Nethy-bridge; Loch Garten; Glenmore; nr. Grantown-on-Spey. Ches. m.v-b.vi, e.vi.....collini Wainwright.

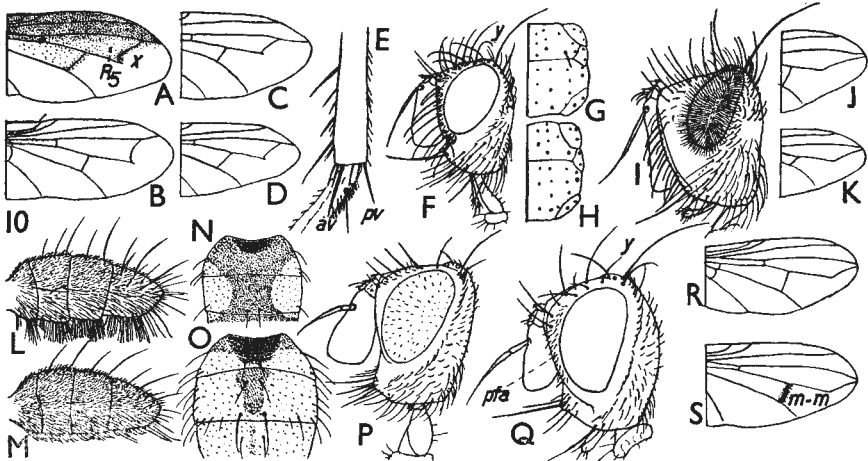


FIG. 10.

Tribe WAGNERIINI.

Genus: *Wagneria* Robineau-Desvoidy, 1830.

- 1 (2) Subbasal marginal of scutellum absent or smaller than discal setae (fig. 9v), scutellum therefore with only two pairs of conspicuous marginals. Intermediate abdominal segments without discals (or only with an odd small one). r_1 bare; stalk of R_5 at least half as long as apical cross-vein (fig. 10A); anterior part of wing, including R_5 and discal cell, strongly infuscate. Abdomen appearing undusted glossy black, thorax with a pair of whitish-dusted vittae. Palpi orange yellow. Figs. 9v, 10A. 3.5-5.5 mm. (= *nigrans* Meigen of Stein, Wainwright, 1928.)
Parasite of caterpillars of AGROTIDAE (Caradrina alsines Brahm and Agrochola circellaris Hufn.). Sussex to Cornwall to Merioneth to Norfolk. Channel Is. e.v-m.ix, sandy coasts, sandhills, sandpits, behaving much like Astarta stigma Klug (SPHEGIDAE) carbonaria Panzer (nec Meigen, Stein).
- 2 (1) Subbasal marginal setae of scutellum strong, subequal to the apical ones (fig. 9w), scutellum therefore with three pairs of conspicuous marginal setae. At least third abdominal segment with strong discals.
- 3 (4) r_1 setulose dorsally on middle part (fig. 10B). *pv* apical spur of hind tibia well developed (fig. 10E). Thorax and abdomen glossy black, appearing undusted on dorsal surface. Anterior part of wing infuscate much as in *carbonaria*. Palpi orange yellow. ♂: third antennal segment large, apex slightly produced dorsally (anteriorly). Figs. 9w, 10B, E. 4-5 mm. (= *carbonaria* Panzer of Meigen, Stein, nec Panzer)
Inverness: Cairngorms, 2200 ft., 26.vi.33 (R. L. Coe) . . prunaria Rondani.
- 4 (3) r_1 bare. *pv* apical spur of hind tibia small or indistinct.
- 5 (8) *prstia* present (fig. 10G). Stalk of R_5 at least as long as *m-m* (fig. 10c), posterior apical angle of R_5 obtuse, and apical cross-vein straight or only very broadly and shallowly concave. Thorax without white-dusted vittae, even before suture, at most the shoulders with slight whitish dust. Excavation of first abdominal segment not reaching hind margin.
- 6 (7) Anterior part of wing brown, r_{4+5} , *m*, and cross-veins suffused. Palpi yellow. Abdomen without whitish dust. Thorax shining bluish black. 2 *stpl*. Parafacialia bare apart from the setae. 7 mm.
*Bred from Caradrina blanda Hb. Sussex: Guestling nr. Hastings, 1890; Surrey: Bookham Common, 11.vi.39; Dorset: Bere Wood, v.45; Yellowham Wood, vi.45. *costata Fallén.*
- 7 (6) Wings hardly brownish tinged, veins not suffused (fig. 10c). Palpi fuscous. Second to fourth abdominal segments with distinct whitish-dusted basal bands (in a strictly dorsal view these are indistinct near median line but conspicuous laterally). Thorax glossy black with some whitish dust at shoulders. 3 *stpl*. Parafacialia setulose between and outwards of the setae. Figs. 7I, 10c, G. 6-7 mm.
Gloucs.: Olveston, 2.vii.22; Hereford: Tarrington, 29.v.98; Woolhope nr. Whitechurch; Worcs.: Wyre Forest, vi. succincta Meigen.
- 8 (5) *prstia* absent (fig. 10H). Stalk of R_5 shorter than *m-m*, posterior apical angle of R_5 sharp or, seldom, right, and apical cross-vein strongly concave near bend (fig. 10D). Thorax with distinct whitish-dusted vittae, especially in front. Excavation of first abdominal segment reaching hind margin. Wings not infuscate.
- 9 (10) Stalk of R_5 almost as long as *m-m* (fig. 10D). Abdomen with indistinct whitish basal bands. White-dusted thoracic vittae less conspicuous behind suture but continuing the *prst* vittae, the *dc* placed along middle of each vitta. ♂: ventral surface of abdomen (fig. 10L) with dense long erect hairs, which are as long as the discals. Fig. 10D, F, H, L. 5.5-7 mm.
Bred from Leucania lythargyria Esp. (AGROTIDAE). Kent to Cornwall to Hereford to Suffolk. m.iv, m.v-e.vi, m.vii-e.ix, woods
latifrons Zetterstedt.
- 10 (9) Stalk of R_5 not or hardly longer than *r-m* (fig. 7F). Abdomen with conspicuous whitish dust on about anterior lateral half of second to fourth segments. White-dusted thoracic vittae rather conspicuous behind suture and on that

part situated between the *acr* and *dc* of each side. ♂: ventral surface of abdomen (fig. 10M) with short half-decumbent hairs. ♂: figs. 7P, 10X. 6-8 mm.

Hosts: *Anchoscelis helvola* L., *Amathes xanthographa* Schiff. (AGROTIDAE) and *Oxyptilus pilosellae* Zell. (PTEROPHORIDAE) [?!]. *England. Wales. Scotland (to Inverness to Aberdeen). e.iv-m.vi, b.vii, b.viii, m.-e.ix, woods and heaths*. *lentis* Meigen.

Tribe CAMPYLOCHAETINI.

Genus *Campylochaeta* Rondani, 1859.

KEY TO SPECIES.

- 1 (2) Upper part of parafacialia setulose (fig. 10I), more than upper half occupied by a spot of dark reflections. Third antennal segment in male longer than greatest diameter of eye, 7-8 times as long as second segment (fig. 10I). Tibiae reddish. *prst ia* absent (see fig. 10H). Apical cross-vein longer than preceding section of *m* (fig. 10J). Thorax of male thinly, of female rather densely, grey dusted with four fuscous-brown vittae; abdominal segments with fuscous-brown hind and narrower fore margins. ♂: frons less than a third head-width at vertex. ♂: figs. 10I, J. 5.5-7 mm. (*obscura* Fallén of authors, nec Fallén, see p. 73).

Parasite of Crocallis elinguaris L. (GEOMETRIDAE), several larvae developing in one caterpillar; the pupa hibernates in the ground. Kent to Somerset to Worcs. to Suffolk. Perth: Loch Katrine. m.iii-m.v, woods. . *praecox* Meigen.

- 2 (1) Parafacialia quite bare (fig. 7J) with uniform reflections. Third antennal segment shorter than greatest diameter of eye (fig. 7J). Legs wholly black. *prst ia* present (see fig. 10G). Apical cross-vein shorter than preceding section of *m* (fig. 10K). Thorax grey dusted, the vittae ill-defined; abdomen with (in postero-lateral view) very broad glossy fuscous-black hind margins and narrow whitish-dusted fore margins; in dorso-lateral view similar to that of *praecox*. ♂: frons fully a third head-width as in female, though without procline orbitals. Figs. 7J, Q, 10K. 4.5-6 mm. (Sbg. *Elpe* Robineau-Desvoidy, *Hypochaeta* Brauer & Bergenstamm; = *distincta* Meigen, = *longicornis* Fallén of Schiner nec Fallén).

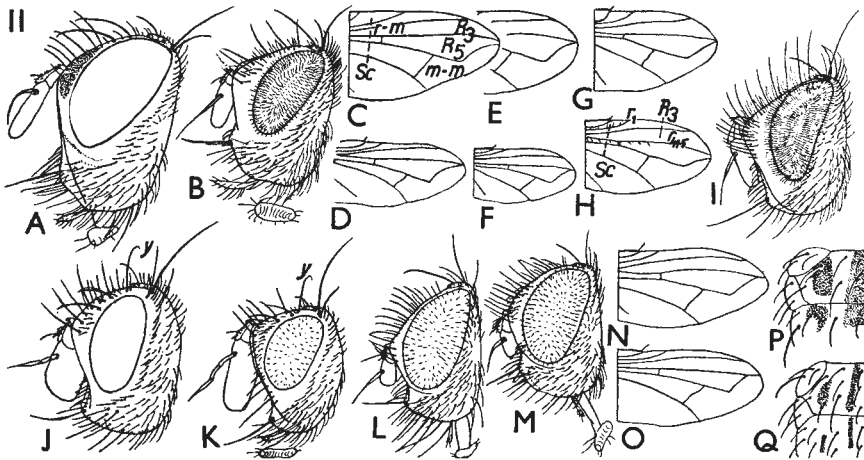


FIG. 11.

Parasite of *Hyloicus pinastri* L. (SPHINGIDAE), *Clostera curtula* L. (NOTODONTIDAE), *Drepana falcataria* L., a foreign *Eilema* (ARCTIIDAE), and especially GEOMETRIDAE. Scotland : *Dumfries to Inverness to Moray*. Local in England and Wales : *Hants., Dorset, Worcs., Salop, Radnor., Suffolk, Lancs., Yorks.* e.v-e.vii, woods **inepta** Meigen.

Tribe HELOCERINI.

KEY TO GENERA.

- 1 (4) Basal dorsal excavation of abdomen not exceeding middle of first segment, at least the second segment without discals (fig. 10N). Mid tibia with 0-1 *ad* setae (see fig. 8N). Facial profile much longer than frontal profile (fig. 10P, Q), vibrissal angles or mouth-margin produced; occiput convex. ♂: frons one-third to one-half head-width. Ground-colour never wholly black (except in *Helocera* ♀).
- 2 (3) Parafacialia bare (fig. 10P). Palpi vestigial (fig. 10P). Eyes thinly short-haired. *m-m* much closer to *r-m* than to bend (fig. 10R). Mid tibia without an *ad* seta, hind tibia with a *pv* apical seta; antennae and legs fuscous. 3 *post dc*. Fuscous-black, the male with the sides of the abdomen testaceous (fig. 10N). Head and thorax rather densely whitish dusted, the latter with four moderately broad undusted vittae, the paramedian ones more or less coalescing at suture, and in female even in their entire length. ♂: figs. 8A, 10N, P, R. 4.5-5.5 mm.

Dorset: *Chene Cliff nr. Portland*; *Camb.*: *Cambridge*, 26.vi.05, *in garden* **Helocera delecta** Meigen.

- 3 (2) Parafacialia setulose on their entire length (fig. 10Q, *pf*a). Palpi well developed, markedly clubbed (fig. 10Q). Eyes bare. *m-m* slightly closer to bend than to *r-m* (fig. 10S). Mid tibia with an *ad* seta, hind tibia without a distinct *pv* apical seta; antennae, palpi and legs pale orange, tarsi and sometimes fore femora browned. 4 *post dc*, the second smaller. Fuscous brown, head, tip of scutellum and parts of the pleurae testaceous translucent; rather thickly cinereous grey dusted, thorax with three broad brownish vittae; abdomen with brown hind margins. Fig. 10Q, s.

Oxon.: *Shotover*, 6.v.16; *Herts.*: *Felden*, 13.vi.94; *Camb.* 26.v.05, *in garden*; *Suffolk*: *Monks Soham*, 17.v.40, *on window*

Stenoparia monstrosicornis Stein.

- 4 (1) Basal dorsal excavation of abdomen reaching or closely approaching hind margin of first segment (fig. 10O); second and third tergites with discals. Mid tibiae with two or more *ad* setae (see fig. 8O).
- 5 (6) Height of jowls as long as smaller diameter of eyes (fig. 11A); vibrissae almost level with lower eye margin, very high above the ventral outline of the head. Eyes bare. Costal spine absent. Abdomen with discals and marginals, first segment without. Head and thorax with moderately thick whitish dust, thorax with three broad blackish vittae; abdomen shining piceous, in a lateral view the off-side whitish dusted. Legs, palpi and most of antennae pale testaceous. ♂: eyes separated by width of third antennal segment. Fig. 11A. 8-9 mm.

Bred from pupae of Lymantria monacha L. (LYMANTRIDAE). *Hants.*: *Lyndhurst, New Forest*, 4.vii.94; *Devon*: *Plympton, dead specimens outside Crabro burrows*; *Gloucs.*: *Parkend*, 29.vii.45, *from nest of pied flycatcher* (N. B. Kinnear!) **Redtenbacheria insignis** Eggers.

- 6 (5) Height of jowls usually shorter than smaller diameter of eye, often only half as long; if almost as long, the vibrissae very far below level of lower eye margins, or eyes densely long-haired; eyes always hairy if the legs are pale.¹⁵
- 7 (14) Second segment of arista up to twice as long as wide (fig. 11B, I) Eyes hairy (hair dense and long except in some *Loewia*). Hind tibia with a strong *pv* apical seta, *m-m* closer to bend than to *r-m* (fig. 11C-F).
- 8 (9) Costal sector in *Sc* at least as long as that in *R*₂; bend of *m* obtuse. Femora, tibiae, palpi, scutellum and most (♂) or all (♀) of abdomen pale ferruginous,

¹⁵ Eyes bare. Legs wholly pale. Apical scutellars small and diverging. Apical cross-vein often absent or vestigial; see *Rhacodineura* (Eryciini), p. 81, which has a well-developed *pv* apical seta on the hind tibia.

most of head and disc of thorax fuscous black with whitish grey dust, thorax with four incomplete undusted vittae. 2 + 3 *acr*, 3 + 3 *dc*; *prst* *ia* absent. ♂: frons about a quarter head-width on upper half. Figs. 10o, 11b, c. 6-8 mm.

Radnor.: Rhyader; *Hereford*: Woolhope; *Ashperton Park at Tar-rington*; *Worcs.*: Wyre Forest. *Moray*: Logie. m.vi-m.vii, woodlands
Hyalurgus lucidus Meigen.

- 9 (8) Costal sector in *Sc* shorter than that in R_3 . Wholly black, except sometimes tip of palpi and interfrontalia; dorsal surface with greenish-brassy or brassy reflections.
- 10 (11) Prosternum setulose (see fig. 2b). Bend of *m* obtusely rounded (fig. 11e), R_5 open or closed in margin; r_{4+5} conspicuously setulose more than halfway to *r-m*. Arista incrassate at least to middle. Facial ridges setulose only close to vibrissae. Apical scutellars very small. Dorsal surface without whitish and with only very thin brown dust. ♂: frons fully a third head-width at vertex, strongly dilated forward; ocellars very strong, directed hardly forward. Fig. 11e. 4.5-7 mm.
- Hosts*: *Panolis griseovariegata* Goeze (AGROTIDAE) and *Acrobasis tumidella* Zinck. (PYRALIDAE). Generally distributed, England, Wales, Scotland (to Ross). Ireland: Co. Cork; Co. Kerry. e.iii, b.v-e.vi, m.vii-m.ix, coast and wastes..... **Lydina aenea** Meigen.
- 11 (10) Prosternum bare (see fig. 2a). Bend of *m* often obtuse, but more or less angular (fig. 11d, f, n, o), not or hardly rounded; r_{4+5} with setulae less than halfway to *r-m*. Arista incrassate on less than basal half (fig. 11i, l, m). ♂: frons not more than about a fifth head-width.
- 12 (13) Apical cross-vein markedly concave from bend to beyond middle, bend of *m* forming an obtuse or right angle; R_5 open or closed in margin (fig. 11d). Setulae on facial ridges reaching about middle, frontal setae descending to below level of arista (fig. 11r). Fuscous-black, grey dusted, the thorax more thinly so in male, more or less brassy, with four undusted vittae; abdomen with fuscous-brown hind margins and large shifting dark spots. Fig. 11d, i. 4-7 mm.
- Parasite of Operophtera brumata* Steph., *Hybernia marginaria* F. (GEOMETRIDAE), *Poecilocampa populi* L. (LASICAMPIDAE), *Eveteria buoliana* Schiff. (OLETHREUTIDAE) and *Celastrina argiolus* L. (LYCAENIDAE); also bred from a SYRPHID (Merodon). Generally distributed, England, Wales, Scotland (to Moray). b.iv-b.vi, common in woods..... **Lypha dubia** Fallén.
- 13 (12) Apical cross-vein straight at least from bend to beyond middle (fig. 11f, n, o), bend broadly obtuse though not rounded; R_5 almost always petiolate. Setulae on facial ridges confined to lower third or so, frontal setae not exceeding apex of second antennal segment (fig. 11l, m). Glossy black or brown-black species. Eyes with sparser and shorter hairs..... **Loewia** (p. 43).
- 14 (7) Second segment of arista elongate, more than thrice as long as wide at base (fig. 11j, k). Eyes practically bare or with distinct but short hair. Costal sector in *Sc* much shorter than that in R_3 (fig. 11 g, h). ♂: frons like that of ♀, more than a third head-width, with proclinate orbitals.
- 15 (16) First segment of arista hardly longer than wide (fig. 11j). Intermediate abdominal segments with several pairs of irregular discals. *m-m* almost halfway between *r-m* and bend (fig. 11g); r_{4+5} setulose on basal node only. *pv* apical seta of hind tibia small or indistinct. Parafacialia bare, jowls on anterior upper part with 1-2 strong setae. 4 *post dc*. Thorax thickly whitish grey dusted, with four incomplete vittae; abdomen grey dusted with fuscous hind margins and median vitta. Fig. 11g, j. 5-7 mm.
- Bred from Eucosma fulvana* Steph. (OLETHREUTIDAE). *Sussex, Surrey, Dorset, Gloucs., to Cambs.* m.vi-e.viii, mainly on chalky downs.....
Neaera albicollis Meigen.
- 16 (15) First segment of arista even longer than second (fig. 11k). Intermediate abdominal segments each with one pair of strong and well differentiated discals. *m-m* closer to *r-m* than to bend (fig. 11h); r_{4+5} setulose to well beyond *r-m*. *pv* apical seta of hind tibia strong. Parafacialia setulose, the setulae developing into strong setae on lower part. 3 *post dc*. Fuscous-black, moderately densely grey dusted, thorax with black vittae, abdomen with black hind margins..... **Digonochaeta** (p. 43).

Genus *Loewia* Eggers, 1856.

- 1 (4) Parafacialia bare below the descending frontals (fig. 11L), except sometimes for 1-2 inconspicuous hairs at lower end. Stalk of R_5 short and less defined against apical cross-vein (fig. 11F), sometimes absent. Eyes more densely hairy.
- 2 (3) *prst ia* strong; 3 *prst acr*; 4 *post dc*, the second sometimes weak. Costal spine absent or indistinct; R_5 sometimes without a stalk. Anterior declivity of thorax thinly though distinctly whitish dusted, with distinct linear undusted paramedian vittae. ♂: eyes almost contiguous. 7.5-9 mm. (*Loewia* s. str.)
Probably not British **brevifrons** Rondani.
- 3 (2) *prst ia* small or absent; only the anterior 2 *prst acr* present; 3 evenly spaced *post dc*. Costal spine longer than *r-m* (fig. 11F); R_5 stalked. Anterior declivity of thorax glossy and undusted, without vittae. ♂: eyes separated by almost width of third antennal segment. ♂: fig. 11F, L. 4-5 mm. (*Fortisia* Rondani 1861, pars; = *brevifrons* Rond. of Meade, pars).
Kent, Hants., Monmouth, Hereford to Suffolk. e. vi-b. viii, woods
phaeoptera Meigen.
- 4 (1) Parafacialia setulose, at least in part (fig. 11M). (Sbg. *Fortisia* Rondani).
- 5 (6) Costal spine absent or indistinct. Setulae of parafacialia longer than third antennal segment, extending over the whole length. 9 mm.
Probably not British ***setibarba** Eggers.
- 6 (5) Costal spine well developed, not markedly shorter than *r-m* (fig. 11N, o). Setulae of parafacialia shorter than third antennal segment. Dorsum glossy black, only the shoulders with thin brown dust. Length not exceeding 7.5 mm.
- 7 (8) Parafacialia with a group of setulae on lower half or less (fig. 11M). Stalk of R_5 less than a fourth or fifth of the apical cross-vein (fig. 11N); r_{4+5} with c. 4-6 setulae at base of dorsal surface. ♂: fig. 11M, N. 6-7.5 mm.
Parasite of Lithobius. Kent to Hants. to Hereford to Suffolk, Notts., Yorks. m. vii-b. ix, costal wastes and woods. **foeda** Meigen.
- 8 (7) Parafacialia setulose in their entire length. Stalk of R_5 about half the length of the apical cross-vein (fig. 11o); r_{4+5} with only 1-2 setulae at base of dorsal surface. Fig. 11o. 4-5.5 mm.
Surrey to Dorset to Hereford to Norfolk. b. vi, m. vii-b. viii, on paths among hunting spiders. **petiolata** Robineau-Desvoidy, Pandellé.

Genus *Digonochaeta* auct. (usual spelling).(Original spelling: *Bigonicheta* Rondani 1845.)

Parasites of the common earwig (*Forficula auricularia* L.) and caterpillars of Lepidoptera Heterocera (various families, see Audcent; Parmenter). (Records from a Cerambycid and a Scolytid are almost certainly due to errors, and this may apply to some or even all of the recorded Lepidopterous hosts, since an earwig may always find access to a cage. On the other hand, Baer and Lundbeck believe that the biology implies intermediate hosts). Fully incubated eggs are deposited near the hosts, into which the larvae burrow. Pupae in soil, under bark, etc., usually hibernating.

- 1 (2) Palpi fuscous-black. Thorax with three broad black vittae before suture (fig. 11P); pollinosity more cinereous or brownish grey. Fig. 11 P, P. 4.3-6.5 mm.
Scotland: Inverness to Aberdeen to Ross. Orkneys? (as spinipennis, Grimshaw). (Records from Norfolk, Suffolk, Notts., Glam. refer probably to spinipennis, and so may the Durham record.) m. v-e. vi. **setipennis** Fallén.
- 2 (1) Palpi brownish orange to brown. Thorax with four narrow black vittae before suture (fig. 11Q), the two paramedian ones separated by a broad pale-dusted vitta, on which the *acr* lie, and which is as pale as that on which the *dc* are placed. Fig. 11Q, Q. 4.5-6 mm.

Generally distributed in England and Wales, extending north to Radnor, Salop, Notts., Aberdeen (Morison, F. v. E. det.) e. iv-m. viii, locally common **spinipennis** Meigen.

Tribe GERMARIINI.

Face and frons very broad and largely rufous.

- 1 (2) Ocellars curved outward and backward (fig. 12A). R_5 distinctly open. The three *post dc* equidistant. Second segment of arista slightly shorter than third. Stoutier, width about 4 mm. Thorax rather thinly whitish dusted with four linear vittae; fore margins of abdominal segments broadly white dusted, these bands interrupted by large shifting dark spots. ♂♀: with two pairs of proclinate orbital setae. Figs. 8F, 12A. 10.5-12.5 mm.

Hosts unknown. Kent: Dover (Clifton, 1831); Faversham ("Huntingfield," not Suffolk locality of this name), 31.vii.04; Hants.; Norfolk: Yarmouth (Curtis, 1835). **Germaria ruficeps** Fallén.

- 2 (1) Ocellars curved outward and forward (fig. 12B). R_5 closed in margin or very shortly stalked (fig. 8c). The anterior two strong *post dc* more widely separated, between them often a smaller fourth seta. Second segment of arista slightly longer than third. Slender, width about 2.5 mm. Thorax as above; abdominal segments with moderately broad white-dusted fore margins, fourth very thinly and more evenly whitish dusted, shifting dark spots not marked. ♂: without proclinate orbital setae. Figs. 8C, 12B. 7-9.5 mm.

Hosts unknown. Kent: Faversham; Essex; Norfolk: Martham, 26.vi.; Waxham, viii.32; Winterton Sandhills; Blakeney Point. e. vi-b. viii, sandy places. **Atractochaeta angustata** Zetterstedt.

Tribe LESKIINI.

Genus **Leskia** Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (2) Frontal setae not descending on parafacialia (fig. 12c), the anterior end of the row only slightly curved outward and not exceeding level of ventral surface of first antennal segment. Occiput almost entirely pale-haired. Antennae, coxae and abdomen wholly orange yellow; ground-colour of frons, face, humeri and scutellum also yellowish. ♂: claws longer than fifth tarsal

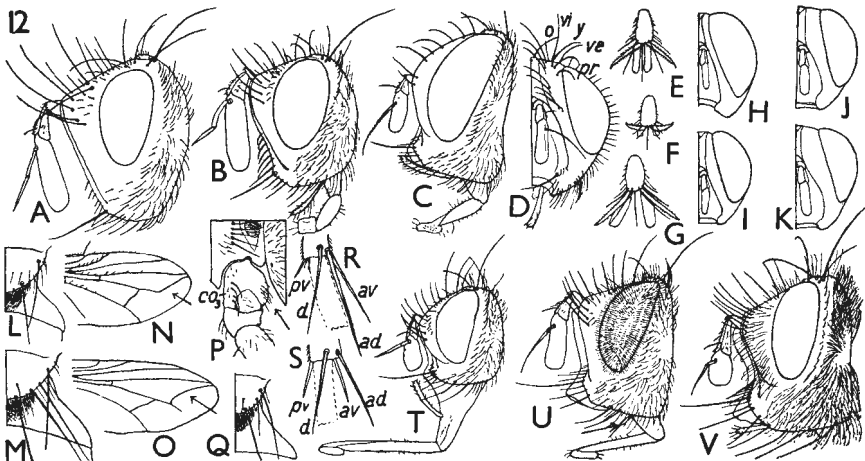


FIG. 12.

segment; frons without proclinate orbitals. Fig. 12c. 7.5-9.5 mm. (Sbg. *Leskia* s. str.)

Parasite of SESIIDAE, also recorded from Evetria buoliana Schiff., Cydia pomonella L. (OLETHREUTIDAE), and a foreign Euzophera (PYRALIDAE). Hants.: nr. Romsey v-vi...... *aurea* Fallén.

- 2 (1) Frontal setae descending on parafacialia, the anterior end of the row strongly curved outward and almost reaching apical level of second antennal segment (figs. 8k, 12d). Occiput with at least a complete row of black setulae behind upper half of occipital row in addition to some more black setulae near upper part of cerebrale. Third antennal segment and parts of coxae and abdomen fuscous in ground-colour; humeri, scutellum, frons and part of the face fuscous with pale pollinosity.
- 3 (8) ♂: claws as long as fifth tarsal segment or longer (fig. 12e, e). ♀: femora wholly pale, at most front ones with a brown streak along dorsal surface. Black setulae of occiput more numerous, forming as a rule at least 2-3 complete irregular rows behind upper half of occipital row. (Sbg. *Anthoica* Rondani = *Myobia* Robineau-Desvoidy, nec Heyden.) Characters for separating the females unknown, and it is doubtful if the next three forms are good species.

- 4 (5) ♂: frons at narrowest part less than a fifth head-width (fig. 12h); parafrontalia wider than interfrontalia, without proclinate orbitals. Claws conspicuously longer than fifth tarsal joint (fig. 12g), fore tarsus more than half as long again as fore tibia. Ocellars hardly longer and stronger than the hairs on the ocellar tubercle. Figs. 8k, 12g, h. 6-9 mm.

Bred from Spilosoma lutea Hufn. (ARCTIDAE) and Orthosia incerta Hufn. (AGROTIDAE). Kent to Cornwall to Merioneth to Cambs. Inverness. Moray: Grantown. b.vii-m.ix, heath and downlands...... *inanis* Fallén.

- 5 (4) ♂: frons at narrowest part at least a quarter head-width (fig. 12i, j); parafrontalia narrower above than interfrontalia, or with proclinate orbitals. Claws about as long as fifth tarsal joint (fig. 12e), fore tarsus up to half as long again as fore tibia. Ocellars distinctly longer and stronger than the hair on ocellar tubercle.
- 6 (7) ♂: frons at narrowest part (at about posterior third) a quarter head-width (fig. 12i); parafrontalia without proclinate orbital setae, narrower at middle and behind than interfrontalia. 5-7 mm.

Hants., Worcs., Warwks. to Herts. m.vii-b.viii, b.ix, wastes on chalk

- 7 (6) ♂: frons at narrowest part (the vertex) a third head-width (fig. 12j); parafrontalia with proclinate orbitals, slightly wider than interfrontalia. ♂: fig. 12d, e, j. 5-8 mm.

Sussex to Devon to Merioneth to Notts. b.vi-m.vi, e.vii-b.ix, e.x

- 8 (3) ♂: claws about two-thirds length of fifth tarsal segment (fig. 12f); frons at narrowest part (vertex) fully a third head-width; parafrontalia as in *vacua*. ♀: femora more or less darkened at base, especially front ones. Legs mostly yellowish, and in male abdomen distinctly yellow on basal part of lateral surface (type form); or legs much darkened and abdomen with little, if any, indication of yellow coloration (ab. *festiva* Robineau-Desvoidy?, *Wainwright*). ♂: Fig. 12f, k. 4.5-7.8 mm. (Sbg. *Solieria* Donovan, *Micromyobia* B. B.; = *pacifica* Meigen, Audcent)

Bred from Aglais urticae L. (Audcent!). Kent to Cornwall to Staffs. to Cambs., Notts.?, Yorks.?, Moray? b.v-b.ix, chalky wastes. (ab. festiva from Gloucs., Warwks., Chesh.)..... *tibialis* v. Roser.

Tribe ECHINOMYIINI.

KEY TO SUBTRIBES.

- 1 (2) Scutellum with only three pairs of marginals, including the apical pair (fig. 12l), the lateral seta being hair-like or absent; apical setae sometimes indistinct. Apical cross-vein normally straight or convex exteriorly (fig. 12n, ↑). Occiput with at least a row of black setulae behind upper part of occipital row (fig. 12t). 3 *post dc*, which are strong (fig. 13e). Costal spine strong, almost

- always much longer than *r-m* (fig. 12N). First tergite without median marginals (except often in *Bithia*). Elongate flies with slender legs. ♀: frons almost always with a transverse praevertical seta. APHRINA (p. 46).
- 2 (1) Scutellum with at least four pairs of marginals, even if (as in some *Ernestia*) the decussate apicals are missing (fig. 12M), the lateral setae always strong. Apical cross-vein concave (fig. 12O, ↑). Flies more or less strongly built. First antennal segment markedly projecting.
- 3 (6) Hind coxae bare along posterior apical margin. Parafacialia bare on at least lower half (figs. 12U, 13G, H, J), except in *Meriania*, without strong setae on lower part. Eyes densely hairy. Propleural depression bare.
- 4 (5) Palpi normal, long, clavate (fig. 13G, J). If the bend of *m* is prolonged by an appendage, this is short and ends bluntly. Ventrites more or less exposed (except in *Micronychia*) ERNESTIINA¹⁶ (p. 48).
- 5 (4) Palpi very short and narrowly band-shaped, often vestigial (fig. 12U, ↑). Bend of *m* with a long appendage which tapers gradually to apex (fig. 12O). Ventrites hidden. Third antennal segment about twice as long as second and much wider, of rectangular shape (fig. 12U) LINNAEMYIINA (p. 51).
- 6 (3) Hind coxae setulose along posterior apical margin (fig. 12P). Parafacialia entirely setulose (fig. 12V). Propleural depression hairy (see fig. 7J, ↑), except when a few *strong* setae are present on parafacialia near lower end of eyes. Second and third antennal segments of subequal length or the second longer. Occiput without black setulae behind upper half of occipital row. Eyes bare ECHINOMYIINA (p. 53).

Subtribe APHRINA.

KEY TO GENERA AND SPECIES.

- 1 (2) More than apical third of r_1 and most of second section of fifth vein setulose (fig. 12N), r_{4+5} setulose on almost its entire length (dorsal surfaces). Upper part of occiput wholly black-setulose. Apical scutellars very small or absent (fig. 12Q). Ocellars divaricate. Eyes virtually bare. Basal excavation of first abdominal segment not reaching hind margin (fig. 12Q). Fuscous-black with dense pale-grey pollinosity, thorax with four incomplete linear vittae and blackish dots at the setal pores. First and second abdominal segments dull ferruginous at sides. Fig. 12N, Q. 5-10.5 mm.

¹⁶ If a small brassy black fly with setulose prosternum, thick arista, and hardly projecting mouth margin is traced to this group, see *Lydina*, p. 42.

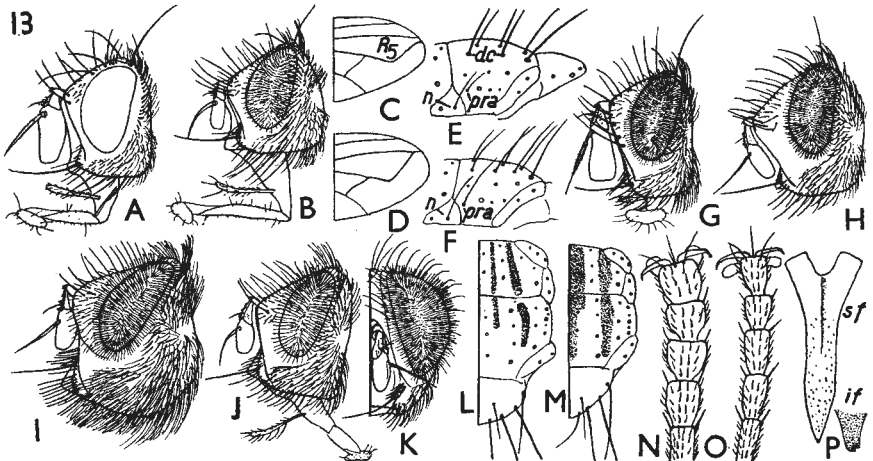


FIG. 13.

- Hants. to Cornwall to Pembroke to Anglesey to Norfolk. Co. Kerry, Co. Waterford. e. vi-e. ix, common on heath and wastes.* ***Bithia spreta*** Meigen.
- 2 (1) Wing veins bare except for *c* and base of r_{4+5} . Upper part of occiput with a row of black setulae behind the occipital row, otherwise pale-haired.
- 3 (8) Palpi pale orange-yellow. Eyes virtually bare. *pv* apical seta of hind tibia absent or small, the *av* apical seta at least 2-3 times as long (fig. 12*r*). Most projecting part of mouth-margin at level of vibrissae (fig. 12*r*).
- 4 (5) Mentum longer than height of head (fig. 12*r*). Abdomen without discals. Setulae on basal part of r_{4+5} almost reaching and sometimes exceeding *r-m*. Black, moderately thinly whitish grey dusted, thorax with four narrow vittae. Interfrontalia and sides of abdomen pale ferruginous, first and posterior half of second to fourth abdominal segments undusted. Fig. 12*L*, *R*, *T*. 6.5-8.5 mm.

Bred from Agrotid larvae ("cutworms"). Hants: Farley Downs; Lyndhurst, New Forest; Dorset: Studland (common); Hamworthy Marshes; Cornwall. e. v-b. vi, e. vi, m. vii-e. viii, heath and downs, locally common

Aphria longirostris Meigen.

- 5 (4) Mentum shorter than height of head (fig. 13*A*, *B*). Abdomen with median discals. Setulae on basal part of r_{4+5} not extending much beyond node. The lateral surface of the second and adjacent abdominal segments less conspicuously or hardly red; usually entirely dark in female.
- 6 (7) Second segment of arista inconspicuous, third normal, much longer than third antennal segment. Apex of scutellum testaceous translucent. Pollinosity cinereous grey; paramedian *prst* vittae narrow but conspicuous. Stouter, resembling a *Sarcophaga*. ♂: parafrontalia without proclinate setae, frons less than a third head-width; pulvilli and claws long. 7.5-10.5 mm.

Bred from an unnamed Sesiid. Hants.: Barton; Farley Downs; Dorset: Southwell, nr. Portland (limestone cliffs). b. viii

Rhinotachina modesta Meigen.

- 7 (6) Second segment of arista twice as long as wide (fig. 13*A*), third incrassate to beyond middle, not or slightly longer than third antennal segment. Scutellum wholly black. Pollinosity whitish grey; vittae and spots on thorax poorly defined; abdomen with conspicuous dark hind margins. ♂: parafrontalia with two proclinate setae (fig. 13*A*), frons (♂♀) more than two-fifths head-width at vertex; pulvilli and claws not or hardly longer than fourth tarsal segment. ♂: fig. 13*A*. 7-10 mm.

Bred on the Continent from Arctia hebe L. (= Eucharhia festiva Hufn.). Sussex to Devon to Gloucs. to Suffolk. e. iv, m. vi-b. viii, downland

Demoticus plebeius Fallén.

- 8 (3) Palpi brown to fuscous. Eyes ~~densely~~ hairy (fig. 13*B*). *pv* apical seta of hind tibia subequal to the *av* one (fig. 12*s*). Combined length of mentum and labella about equalling height of head, proboscis exceeding mouth-margin when in resting position. Apical scutellars distinct.
- 9 (10) R_5 open (fig. 13*C*), distance between bend of *m* and wing margin in line with *m* (normally) shorter than that between bend and *m-m*. Most projecting part of mouth-margin below level of vibrissae (fig. 13*B*). Rather densely cinereous-grey dusted, the four thoracic vittae conspicuous; abdomen with fuscous-brown hind margins, without or with small red ventro-lateral spots. ♂: claws and pulvilli of front legs almost as long as the combined length of the last two tarsal segments; frons normally one-seventh to one-eighth head-width and without a praevertical seta, varying to one-fifth head-width with a strong praevertical. Fig. 13*B*, *C*. 5-8 mm. (= *angustifrons* Meade, = *ciliaris* Zetterstedt of Meade.)

Bred abroad from Pyrausta porphyralis Schiff. (PYRALIDAE). Kent to Dorset to Hereford to Herts. Recorded from Yorks. e. v-e. vi, m. vii-m. viii, downland ***Rhynchista prolixa*** Meigen.

- 10 (9) R_5 (fig. 13*D*) short-petiolate (or closed in margin); distance between bend of wing and margin at least as long as that between bend and *m-m*. Most projecting part of mouth-margin level with vibrissae. More thinly whitish-grey dusted, thoracic vittae more inconspicuous, hind margins of abdomen less well defined, sides largely red, at least in female, median vitta and tip black. ♂: claws and pulvilli not much longer than fifth tarsal joint; frons one-fifth head-width, in most British specimens with a strong proclinate seta;

red abdominal spots smaller. (In *rufomaculata* Deg., which does not seem to occur in Britain, the abdomen of the male is more extensively red, the proclinate seta absent and the frons usually narrower). Figs. 8o, 12s, 13D. 5-10 mm.

Parasite of the foreign Arctia hebe L. (ARCTIIDAE), NOCTUIDAE and "Spinner" (= the old "Bombycids"). Generally distributed, Channel Is., England, Wales, Ireland (at least S. and W.), I.O.M., Scotland (to Inverness and Moray). e. vi-e. ix, common, especially on ragwort flowers

Eriothrix rufomaculata monochaeta Wainwright.

Subtribe ERNESTIINA.

Belonging to Pantel's group 4. The hosts are Lepidoptera and, almost without exception, Heterocera. Pupation in the ground.

KEY TO GENERA.

- 1 (2) Third antennal segment 2 (♀) to 3 (♂) times as long as second (fig. 13G). Frontal setae descending below level of arista. *pra* shorter than second *npl* (fig. 13E); 3 + 3 *acr*; 3 *post dc*. Scutellum with fine cruciate apicals and three pairs of strong marginals. Fuscous-black, rather densely pale grey dusted, thorax with four (six) conspicuous black vittae, apex of scutellum orange; abdomen with large brassy-black shifting spots, hypopygium (♂) or apex of fourth tergite (♀) orange. Transverse veins, especially *r-m*, suffused. ♀: front tarsi strongly dilated. Fig. 13E, g. 5.5-8 mm. (= *Eversmania* auct. nec Robineau-Desvoidy).
Bred from *Notodonta phoebe* Sieb. (NOTODONTIDAE) and *Hydriomena coeruleata* F. (GEOMETRIDAE). Scotland: Perth to Sutherland. Durham: nr. Gateshead; Lancs.; Norfolk: Hickling (H. W. Andrews). b. v, m. vi-e. vii, moorland, on birches. **Micronychia ruficauda** Zetterstedt.
- 2 (1) Third antennal segment up to about half as long again as second (fig. 13H). Frontal setae descending to level of about middle, and never quite of apex, of second antennal segment. *pra* sometimes thinner but never markedly shorter than second *npl* (fig. 13F).
- 3 (6) Glossy metallic green, blue-green, seldom darker, general appearance of a slender *Lucilia*. Only the anterior surface of the head whitish dusted. 3 + 3 *acr*. ♀: fore tarsi only slightly dilated.
- 4 (5) Mouth-margin hardly projecting (fig. 13H). Bend of *m* with a long appendage (never markedly shorter than *r-m*); *r-m* setulose only near node. 4 *post dc*; apical (or closely placed subapical?) scutellars very strong and diverging. Intermediate abdominal segments with several pairs of discals. Palpi fuscous-black. ♂: fig. 13F, H. 6.5-11 mm.
Parasite of *Petilampa minima* Haw. (AGROTIDAE), *Ortholitha chenopodiata* L. (GEOMETRIDAE), *Dasychira pudibunda* L. and *Lymantria monacha* L. (LYMANTRIIDAE). Generally distributed, England, Wales, I.O.M., Scotland (to Sutherland), Ireland (Co. Cork), Hebrides. e. iii-e. vi (b. viii)
- 5 (4) Mouth-margin strongly projecting. Bend of *m* without (or with a vestigial) appendage; *r*₄₊₅ setulose more than halfway to *r-m*. 3 *post dc*; apical scutellars fine and cruciate, the strong diverging subapical ones widely separated. Intermediate abdominal segments usually with only one pair of discals. Palpi pale testaceous. 8-9 mm.
Host *Horisme tersata* Hb. (GEOMETRIDAE). Gloucs.: Rodborough, 17. vii. 43 (*T. B. Fletcher*). **Chrysosomopsis aurata** Fallén.
- 6 (3) Ground-colour blackish, not metallic. Pollinosity more conspicuous on dorsal surface.
- 7 (8) Parafacialia bare on lower half or more (fig. 13J); vibrissae lying above mouth-margin as a rule by much less than width of third antennal segment. 3 *stpl*. First abdominal segment as a rule without marginals. Hair of jowls, pleurae and underside black and of normal rigidity even when fine. **Ernestia**.
- 8 (7) Parafacialia densely and wholly hairy (fig. 13I); vibrissae lying above mouth-margin by width of third antennal segment, peristomal setae therefore

ascending thus far in a double or triple row. 2 *stpl*, seldom 3. First abdominal segment with marginals. Hair of jowls, pleurae and underside soft and furry, that of the jowls wholly, that on the other parts in places, fawn coloured. 2 + 1-2 *acr*; 4 *post dc*. Fuscous-black, most of scutellum, and sides of abdomen in male, but for the hind margins, pale ferruginous. ♂: fig. 13H. 9-12.5 mm.

Recorded as parasite of *Panolis flammea* Schiff. (AGROTIDAE) and LASIOCAMPIDAE. Notts., Lincs., Berks., Surrey: Holmbury; Wisley; Bookham Common; very local, but males sometimes not rare. e.iii-m.iv, on woodland paths, sunning on tree trunks and leaves. Meriania puparum F.

Genus *Ernestia* Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (6) ♂: with indistinct hair-like ocellars and verticals (fig. 13r); frons in front of ocelli at most one-fifth head-width. ♀: second antennal segment and palpi pale orange, the former shorter than the third; fore tarsi very strongly dilated, second segment almost or fully as wide as long (fig. 13N). ♂♀: bend of *m* without, seldom with a vestigial, appendage. 4 *post dc*; 2-3 *post acr*. Black, scutellum usually more or less red; abdomen with large shifting spots, black ground-colour conspicuous, sides of segments (1-) 2-3 (-4) often orange in male. (Sbg. *Ernestia* s. str. = *Panzeria* Robineau-Desvoidy).
- 2 (3) Scutellum without decussate apical setae (fig. 13L), the most apical pair strong, diverging or parallel, less widely separated than the *prsc acr* from the *dc*; orange but for base. 2 *prst acr*, the pair at suture absent. Thorax with four undusted vittae in front of suture (fig. 13L). ♂: frons one-sixth to one-fifth head-width at narrowest part (fig. 13K); superior forceps and tip of inferior fig. 13P. ♀: frons more than a third head-width at vertex. ♂: fig. 13J, K, L, P. ♀: fig. 13N. 7-10 mm. (= *glabrata* Meigen of Meade)
Bred from *Abrostola tripartita* Hufn. (!), *Cosmia trapezina* L., *Orthosia cruda* Schiff., and *O. populeti* F. (AGROTIDAE) and *Achlya flavicornis* L. (THYATRIDAE). *Kent to Somerset to Moray to Aberdeen*. e.iv-e.vi, 1 ♂ 24.ix(!), woods. nielsenii Villeneuve.
- 3 (2) Scutellum with a pair of finer decussate apical setae (fig. 13M), which are seldom missing, in this case the strong subapical pair more widely separated than the *prsc acr* from the *dc*. ♂: frons at narrowest part about a tenth head-width, narrower than lunula. ♀: frons almost to fully a third head-width at vertex.
- 4 (5) No *prst acr* behind level of *prst dc* (see fig. 13L). Thorax with four vittae, the paramedian pair separated by grey dust (see fig. 13L). Pale-dusted bands of abdomen less conspicuous near median line, the lateral surface of the second and third abdominal segments in male almost always broadly reddish as is the apex of the scutellum. ♂: superior and tip of inferior forceps fig. 14A, the former rugosely punctured and haired to apex, in lateral view almost straight. ♀: genital segments broadly exposed, finely haired, fifth and sixth ventrites strongly transverse, sixth shining and convex, without a marked median groove (fig. 14C). 8-13 mm.
Parasite of *Panolis flammea* Schiff., *Orthosia stabilis* Schiff. (AGROTIDAE), *Lymantria monacha* L. and *dispar* L. (LYMANTRIDAE) and abroad *Dendrolimus* (LASIOCAMPIDAE). *Generally distributed, England, Wales, Scotland, Ireland*. b.v-b.vii (1 ♀ 5.viii); very common in woods, fond of *Euphorbia* flowers. rudis Fallén.
- 5 (4) A pair of *prst acr* (normally) close to suture (fig. 13M); thorax with three broad black undusted vittae. Pale-dusted bands of abdomen more conspicuous, lateral surface usually without any red and the scutellum with very little. ♂: superior forceps (fig. 14B) smooth on apical half, which is sinuous in lateral view. ♀: genital segments rather retracted (fig. 14D), obscured by dense bristles, fifth and sixth ventrites less transverse, concave and with a conspicuous median groove. Figs. 13M, 14B, D. 10-12.5 mm.
Kent to Devon to Merioneth to Worcs. Inverness, Moray. e.iv-e.vi, m.vii. vagans Meigen.

- 6 (1) ♂: with conspicuous ocellars and verticals (fig. 14E). ♀: second antennal segment fuscous-red to fuscous-black; tarsi (except in *consobrina*) less dilated, second segment markedly longer than wide (fig. 13o).
- 7 (8) Scutellum without decussate apical setae, the most apical pair strong, diverging or parallel, less widely separated than the *acr* from the *dc* (see fig. 13L); wholly black. Bend of *m* with a distinct appendage, which may reach length of *r-m* (see fig. 14o). 0(1)+1 *acr*. Second abdominal segment with strong discals and marginals. Black with conspicuous whitish dust, thorax with three broad undusted vittae (see fig. 13M); abdominal pollinosity not very dense; hind margins glossy black. ♂: frons more than a quarter head-width at narrowest part (fig. 14E); forceps fig. 14I. Figs. 12M, 13o, 14E, I. 8.3-11.5 mm. (Sbg. *Fausta* Robineau-Desvoidy).

Bred from Orthosia cruda Schiff. Kent to Devon to Hereford to Norfolk, Durham. (b. vi), (e. vi), m. vii-e. viii, *downs, on white umbels (Angelica?)*

nemorum Meigen.

- 8 (7) Scutellum with a pair of decussate apical setae (see fig. 13M), which are seldom missing, in this case the subapical pair strong and more widely separated than the *prsc acr* from the *dc*.
- 9 (10) Second segment of arista more than twice as long as wide at apex, as long as basal width of second antennal segment or longer (fig. 14F). Costal spine distinct. *prst ia* strong. Bend of *m* with a conspicuous appendage (fig. 14H). 2+2-3 *acr*. Black, apex of scutellum and sometimes small lateral areas on abdomen reddish; rather densely whitish dusted, thorax with 3-4 conspicuous undusted vittae anteriorly, the paramedian ones fused in male and some females; abdomen with whitish dusted anterior half of the segments, this dust almost halved by large shifting black spots. ♂: frons more than a quarter, ♀: frons more than a third, head-width. ♂: forceps, fig. 14J. Figs. 14F, H, J. 7-10 mm. (Sbg. *Appendicia* Stein.)

Sussex, Glamorgan to Warwks. to Notts. to Sutherland, mainly on northern moorlands. b. v-b. vii, *local*..... *truncata* Zetterstedt.

- 10 (9) Second segment of arista less than twice as long as wide and much shorter than basal width of second antennal segment (fig. 14G). Costal spine indistinct. *prst ia* (normally) absent. (Sbg. *Varichaeta* Speiser and—only *caesia*—*Eurythia* Robineau-Desvoidy).
- 11 (18) Palpi fuscous-black. ♂: apical half or so of inferior forceps straight (lateral view), stippled in fig. 14Q and R.
- 12 (13) Fourth abdominal segment without the whitish pollinosity which is conspicuous on the intermediate segments, only with evenly distributed thin

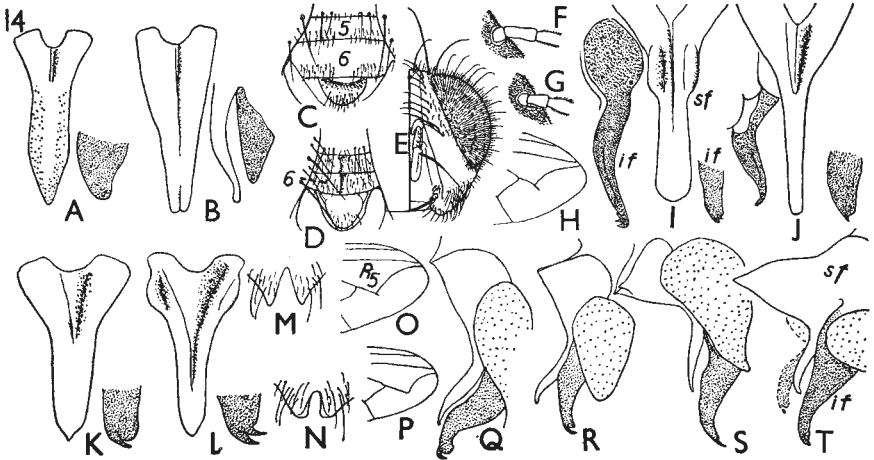


FIG. 14.

brownish dust which becomes visible in a tangential view. 3 *post dc.* Parafacialia wider than third antennal segment, the latter somewhat longer than second. ♂: frons at narrowest part almost a fifth head-width; forcipes: fig. 14K. 7.5-12.5 mm.

Bred from Nymphalis io L., Lophopteryx capucina L. (NOTODONTIDAE), Malacosoma (LASIOCAMPIDAE), Spilosoma (ARCTIIDAE), and various SPHINGIDAE and AGROTIDAE. Generally distributed, England, Wales, S. Scotland (to Dumbarton), Ireland, I.o.M. m. vii-e. ix, marshes, very common

radicum F.

13 (12) Fourth abdominal segment with whitish dust much like the intermediate segments.

14 (15) Second antennal segment slightly longer than third. Normally 4 *post dc.* Parafacialia about as wide as third antennal segment. ♂: frons at narrowest part one-sixth to one-fifth head-width; forcipes: fig. 14L. 8.5-12 mm.

Parasite of various Hadena and other AGROTINAE. Three authentic records: Kent, Folkestone, bred 24. v., 6. vi, 11. vi, 21. vi. 03 (L. A. Spencer), ♀ only; Hants.: Breamore Down, 19 and 23. vi. 53 (J. E. Collin and H. W. Andrews) ♂♀; Herts: Chipperfield, 5. vii. 53 (C. H. Andrewes!) ♀.....caesia Fallén.

15 (14) Second antennal segment not longer than third. 3 *post dc.*

16 (17) Parafacialia much wider than third antennal segment. Bend of *m* forming an abrupt angle with a short or vestigial appendage (fig. 14O). ♂: frons about three-tenths head-width; fourth ventrite, fig. 14M; forcipes in fig. 14Q. ♀: frons more than a third head-width. 8.5-10.5 mm.

Glamorgan: Porthcaul, Hants.: New Forest; Sussex: Selsey (C. H. Andrewes!) Suffolk: Worlington; Culford; Lancs. e. iv-b. vi, b. vii, marshes and wastes.

conjugata Zetterstedt.

17 (16) Parafacialia much narrower below than third antennal segment. Bend of *m* narrowly rounded without an appendage (fig. 14P). ♂: frons about a fifth head-width; fourth ventrite fig. 14N; inferior forcipes in lateral view much less curved, otherwise like the superior forcipes (fig. 14R) similar to those of *conjugata*. ♀: frons hardly three-tenths head-width. 8.5-11 mm.

Bred from Mamestra persicariae L. (AGROTIDAE). S.W. England: Cornwall (St. Ives); Somerset, Gloucs., S. Ireland: Co. Waterford; Co. Kerry. (m. v), m. vii-b. viii, b. ix.....connivens Zetterstedt.

18 (11) Palpi brownish yellow. ♂: apical half of inferior forcipes strongly incurved (fig. 14s, r), giving it a claw-like shape (lateral view).

19 (20) 3 *post dc.* ♂: frons about one-sixth head-width; the tooth-like median keel on basal part of superior forcipes (fig. 14s) shortly triangular in lateral view, broader than high, apex in posterior view shortly bifid (this can be seen when the genitalia are retracted, the two points lying close to the inner base of the lobes of the fourth ventrite). ♀: frons at vertex one-third head-width. 9-11.5 mm.

Sussex to Dorset to Bucks. to Suffolk. e. vi-e. viii, downland, local

vidua Zetterstedt.

20 (19) 4 *post dc.* ♂: frons less than one-sixth head-width; the tooth-like median keel on basal part of superior forcipes (fig. 14T) very large, higher than broad, triangular, strongly compressed laterally, with simple apex. ♀: frons three-tenths head-width. 9-11.5 mm.

Bred from Lymantria dispar L. (LYMANTRIIDAE), Eriogaster lanestris L. (LASIOCAMPIDAE), Saturnia pavonia L. (SATURNIIDAE), Mamestra brassicae L., oleracea L. and Cucullia artemisiae Hufn. (AGROTIDAE). Surrey, Hants., Somerset, Gloucs., Norfolk (frequent Fowl Mere), N. England (frequent Chatmoss, Lancs.), Ross. Co. Waterford, Co. Cork, Co. Kerry. (e. iv), b. vi-m. vi, m. vii-b. ix, locally frequent.....consobrina Meigen.

Subtribe LINNAEMYIINA.

Genus *Linnaemyia* Robineau-Desvoidy, 1830 (= *Micropalpus* Macquart, 1834).

Parasites of HETEROCERA, apparently especially AGROTINAE, habits as in ERNESTIINA and ECHINOMYIINA. Characters printed in *italics* distinguish the species in question from all other British *Linnaemyia*.

KEY TO SPECIES.

- 1 (4) Bend of *m* 3–5 times as distant from wing margin as from *m-m* (fig. 15A); most of C_2 , basal quarter of discal cell and base of adjoining cells devoid of microscopic hairs (fig. 15A). Palpi 2–3 times as long as wide and hardly half as long as diameter of mentum. Hair of jowls all or almost all whitish, fine (fig. 15B). Hair of mesopleura largely pale yellowish.
- 2 (3) Femora and tibiae reddish yellow, coxae reddish yellow with a fuscous stripe along antero-ventral (-interior) surface. Parafacialia not wider than third antennal segment (fig. 12U). Abdomen brownish orange with the first segment largely and a median vitta piceous (fig. 15D). ♂: without proclinate orbitals. ♂: figs. 12U, 15A, D. 9–11.5 mm. (*Linnaemyia* Robineau-Desvoidy.)

Bred from *Hyloicus pinastri* L. and *Hemaris tityus* L.? (SPHINGIDAE), *Lycophotia porphyrea* Hb., *Eumichtia satura* Schiff. and *adusta* Esp. (AGROTINAE), and *Sphacia bembeciformis* Hb. (SESIIDAE). Generally distributed, England, Scotland (to Ross and Orkneys). Ireland. m.vi–e.ix, heaths, very common *vulpina* Fallén.

- 3 (2) Femora and coxae fuscous black, tibiae dull reddish translucent. Parafacialia conspicuously wider than third antennal segment (fig. 15B). Abdomen fuscous-black, sides reddish, especially in male, but with fuscous lateral spots which often (always in ♀) coalesce with the dark coloration of the disc (fig. 15E). ♂ with proclinate orbital setae; (fig. 15B, E). 8.5–11.5. (*Bonnetia*, R.-D., *Micropalpus* Macquart).

Bred from *Hyloicus pinastri* L. (SPHINGIDAE), *Saturnia pavonia* L. and *Agrotis ypsilon* Hufn., foreign *Feltia*, *Euxoa*, *Peridroma*, *Laphygma*, *Polia*, etc. *Sussex*: Jevington; *Lewes*; Clapham Woods; *Alfriston*; *Surrey*: Bisley Common; *Dorset*: Doles-Ash; *Coombe Keynes*. *Ross*: N. Sutor. b.vi–m.vi, m.vii–m.viii, downland and wastes, local and rare

- 4 (1) Bend of *m* about twice as distant from wing margin as from *m-m*. Palpi not shorter than diameter of mentum. Hair of jowls wholly or largely and of mesopleurae wholly black. Femora, coxae and often tibiae blackish. Parafacialia narrower than third antennal segment. Fuscous-black with conspicuous whitish dust, except on the black thoracic vittae and hind marginal bands of the abdomen; lateral part of tergites 2 and 3 broadly reddish in male. ♂: without proclinate orbital setae.

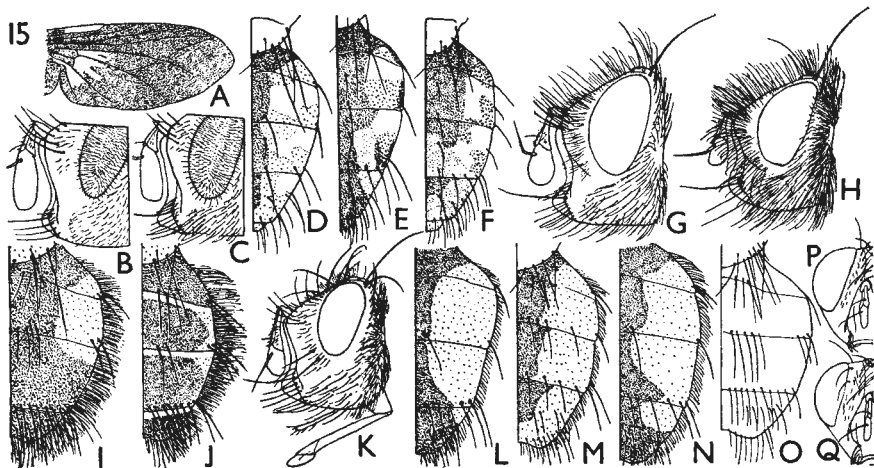


FIG. 15.

- 5 (6) Black hairs of the jowls all fine and of subequal thickness, lower part of jowls with some pale hairs. Most of C_2 , basal quarter of discal cell and base of adjoining cells devoid of microscopic hairs. ♂: pale parts of abdomen more brownish yellow; hypopygium and first genital segment fuscous. 8.5-11.5 mm. (*Amphisa* Robineau-Desvoidy nec Curtis, *Homoeonychia* Brauer & Bergenstamm; = *quadraticornis* Meade).

Kent to Dorset to Ozon. to Suffolk. e.v-m.vi, b.viii-m.ix, *marshes*

pubica Rondani.

- 6 (5) *Some of the black hairs on the jowls conspicuously stronger and longer* (fig. 15c), the hair all black. *Wings entirely covered with microscopic hair.* ♂: pale parts of abdomen (fig. 15f) dull orange; hypopygium and first genital segment orange. ♂: figs. 12c, 15c, f. 8-10.5 mm. (*Bonellia* Robineau-Desvoidy nec Rolando; *Bonellomyia* Townsend.)

Bred from Leucoma salicis L. (LYMANTRIIDAE), Celerio euphorbiae L. (SPHINGIDAE) and Amathes c-nigrum L. (AGROTINAE). Scotland: Sutherland to Perth. N. England: Durham; Lancs. e.vi-b.ix

haemorrhoidalis Fallén.

Subtribe ECHINOMYIINA

Parasites of Lepidoptera. Biology as in *Ernestiina*, but pupation of some species occurs in the host.

KEY TO GENERA.

- 1 (4) Parafacialia without strong (i.e., isolated and as strong as the inclinate frontals) setae near lower end of eyes (figs. 12v, 15g, n). Ocellars (normally) well developed. Propleural depression hairy (see fig. 7j, ↑).
- 2 (3) Thorax and abdomen in addition to the setae with short largely decumbent stiff setulose hairs (fig. 15m, n)..... *Echinomyia* (p. 54).
- 3 (2) Thorax and abdomen in addition to the strong setae with long erect fur-like hair (fig. 15i, j). Second abdominal segment with 4-8 marginals. Legs never wholly black. Abdomen broadly black on dorsal surface, especially on third and fourth segments..... *Servillia* (p. 53).
- 4 (1) Parafacialia with a few strong setae, subequal to the inclinate frontals, near lower end of eyes (fig. 15k). Ocellars absent. Propleural depression bare. Normally the first abdominal segment without, the second with marginals (fig. 15l). *4 post dc.* Jowls and mesopleurae with long black setulose hairs. Palpi and proboscis long and slender (fig. 15k). Fuscous-black, including antennae, shoulders and legs (except much of tibiae); face and palpi pale testaceous; scutellum and abdomen (fig. 15l) pale ferruginous, the latter with black base, tip and complete or incomplete median vitta. ♂: with proclinate orbitals. ♂: figs. 15k, l. 9-14 mm.

Parasite of Papilio machaon L., Agrotis segetum Schiff., ypsilon Rott., vestigialis Hufn., and Lymantria monacha L. Channel Is. 19.ix. Cambs.: Devil's Ditch. Sandy places..... *Petieria nigricornis* Meigen.

Genus *Servillia* Robineau-Desvoidy, 1830.

- 1 (2) Parafacialia much more finely haired than the region of the lowest (descending) frontal setae (fig. 15g), hair not very dense, largely pale. Scutellum with cruciate apicals (fig. 15r). Abdominal segments as a rule without a pale-dusted basal band, more shining, usually with bright testaceous markings on lateral part (fig. 15i). Hair shorter and largely pale. Femora usually more or less yellow. ♂: fig. 15g, r. 11-13 mm.

Bred from Celerio euphorbiae L. (SPHINGIDAE), Acronycta aceris L., Orthosia stabilis Schiff. and Cucullia verbasci L. (AGROTIDAE). Kent to Cornwall to Hereford to Suffolk. e.iii-b.vii, *woods*..... *lurida* F.

- 2 (1) Parafacialia as coarsely haired as the region of the lowest frontal setae; as strikingly black-bristly as anterior part of parafrontalia (fig. 15n). Scutellum without cruciate apicals (fig. 15r). Second to fourth abdominal segments each with a narrow band of whitish dust along fore margin, less shining, without, or with less conspicuous, testaceous markings on lateral part. Hair longer. Femora dark throughout. ♂: fig. 15n, j. 11-16 mm.

Kent to Devon to Warwks. to Surrey. e.iii-m.vi..... *ursina* Meigen.

Genus *Echinomyia* Latreille, 1805.

ECHINOMYIÆ Duméril, 1800, *Tachina*, Meigen, 1803 nec 1838 (explanation, see under *Tachina*, p. 70). The species are found especially in sandy places.

KEY TO SPECIES.

- 1 (2) Abdomen and thorax wholly piceous black, second and third segments with (3-)4 or more median marginals on each side (fig. 15 o). Scutellum with 4-6 marginal setae on each side (fig. 15 o). Thorax without distinct pollinosity. Head pale testaceous with dense golden dust, even on the infusate parts; basal antennal segments pale ferruginous. Legs piceous black, tibiae paler. Lower calyptra fuscous. Wings yellowish orange at base up to *r-m*. ♂: fig. 15 o. 13.5-20 mm.
In appearance and flight very similar to a bumble-bee. Bred from Hyloicus pinastri L. and Hemaris fuciformis L. (SPHINGIDÆ), Euproctis chrysorrhoea L. (LYMANTRIDÆ), Lasiocampa quercus L., L. trifolii Schiff., and Macrothylacia rubi L., etc. (LASIOCAMPIDÆ). Generally distributed, England, Wales, Scotland (to Ross.), Ireland. (b.ii), m.vi-e.viii (Scotland—m.ix) (forced hatchings 28.iii., 4.iv), woods, heaths, common locally..... grossa L.
- 2 (1) Abdomen reddish in part (fig. 15M, N), second segment with not more than 3-4 median marginals on each side. Scutellum with 3-4 marginal setae on each side.
- 3 (6) At least tibiae, palpi and basal antennal segments reddish yellow. Palpi sub-cylindrical. Thorax more or less grey dusted. Median vitta of abdomen (fig. 15M) almost parallel-sided, not or only slightly narrowed behind base of intermediate segments.
- 4 (5) Hair of jowls as a rule all yellow (fig. 12v). Frons of male one quarter to three-tenths head-width (fig. 15P), of female about one-third (up to 0.36) head width. Third antennal segment less broad and less black than in the same sex of *magnicornis*. ♂: proclinate orbitals absent; femora piceous, usually with pale apex. ♀: femora wholly pale, base sometimes narrowly infusate. ♂: figs. 12v, 15M, P. (6.5-)10-14 mm.
Parasite of Lymantria dispar L., monacha L., Euproctis phaeorrhoea Don., Dasychira pudibunda L. (LYMANTRIDÆ), Lithosia quadra L., etc. (ARCTIIDÆ), Acronycta aceris L., Amathes glareosa Esq., Mamestra pisi L., Heliothis peltigera Schiff., Phlogophora meticulosa L., Leucania obsoleta Hb. and Panolis flammea Schiff. (AGROTIDÆ). Generally distributed, England, Wales, Scotland (to Ross.), Ireland. e.iv-m.ix, woods and marshes, very common fera L.
- 5 (4) Hair of jowls all or largely black. Frons about two-fifths head-width (fig. 15Q), but in male sometimes as little as one-third. ♂: normally with 1-3 proclinate orbitals; femora usually wholly piceous. ♀: femora piceous at least on basal part. ♂: fig. 15Q. 9-14 mm. (*Eudoromyia* Bezzi, 1906.)
Bred from Euproctis phaeorrhoea L., Lymantria dispar L. (LYMANTRIDÆ), Agrotis segetum Schiff., Euxoa tritici L., Laphygma exigua Hb., Panolis flammea Schiff. and Eumichtis adusta Esq. (AGROTIDÆ). Probably not British magnicornis Zetterstedt.
- 6 (3) Tibiae dark brown to black, at most the hindmost pair somewhat reddish translucent; palpi dark brown on more than basal half, the reddish-yellow apical third clubbed and compressed. Antennae wholly fuscous. Thorax not grey-dusted, except in posterior view. Median vitta of abdomen (fig. 15N) strongly constricted shortly behind base of (second and) third segment, less than half as wide at narrowest part as at hind margin of third segment. ♂: without proclinate orbitals. 11-15 mm. (Sbg. *Fabriciella* Bezzi.)
Bred from Apamea monoglypha Hufn. and Actinotia polyodon Clerck (AGROTIDÆ). Kent to Cornwall to Lancs. to Derby to Norfolk. Channel Is. (7.ii., 19.ii) b.vii-b.x, heaths and marshes, locally common in Worcs. and S. coast counties. ferox Panzer.

Subfamily TACHININÆ.

KEY TO TRIBES.

- 1 (4) Bend of *m* without a darkened fold or appendage, broadly or narrowly rounded; R_5 ending close to wing tip (fig. 16E). Apical scutellars fine or absent (figs. 16A, B). 3 *post dc*, except in some SIPHONINI.
- 2 (3) Subapical scutellars strong and diverging, rather close together (fig. 16A, s). Legs black (in British species), only tibiae sometimes reddish. Fourth tergite almost always with discals. Frons of male as a rule narrower than that of female. Peristoma with a more or less distinct occipital dilation (figs. 16H-J) MEIGENIINI (p. 55).
- 3 (2) Subapical scutellars distinctly converging, enclosing the apicals (fig. 16B, s). Basal excavation of abdomen not or hardly exceeding middle of first segment; fourth tergite often without discals. Mid tibia with only 1 *ad*, except in *Ceranthia*, where the legs are almost wholly pale. Frons wide in both sexes. Peristoma with a short or without an occipital dilation (figs. 19H, U, 20A) SIPHONINI (p. 63).
- 4 (1) Bend of *m* prolonged by a more or less distinct darkened fold or appendage, angular; R_5 ending well in front of wing tip (figs. 16F, G). Apical scutellars rather strong and cruciate (but absent in *Ptychomyia*), the subapical ones normal, diverging (figs. 16C, D). Mid tibiae usually with several *ad* setae.
- 5 (6) *m-m* very oblique, even more so than apical cross-vein; r_{4+5} setulose at least almost to *r-m* and usually beyond (fig. 16F). Apparent subapical setae of scutellum (the real ones weak or absent, the lateral ones very strong) which, apart from the apicals, are the distal ones of the strong setae, widely separated, as distant from apex as from base of scutellum (fig. 16C), sometimes even closer to base; apical setae strong and cruciate; several pairs of erect discal setae present on more than posterior half, the last of them much stronger and close to hind margin. Frons very broad in both sexes. Peristoma without an occipital dilation (figs. 21G-I). Parafacialia with one or several strong proclinate setae. *prst ia* present. Occiput without black setulae behind upper half of occipital row¹⁷ VORIINI (p. 68).
- 6 (5) *m-m* always less oblique than the apical cross-vein (fig. 16G). Subapical setae of scutellum closer to apex than to base of scutellum (fig. 16D, s) TACHINIINI (p. 69).

Tribe MEIGENIINI (COMPSILURINI, BLONDELIINI).

KEY TO GENERA.

- 1 (10) Vibrissae lying distinctly above mouth-margin (figs. 16H, I), if not or only slightly so (fig. 16J), the eyes conspicuously and densely hairy, and the mouth-margin between the vibrissae more or less convex. R_5 always open (fig. 16E) or, at the most, closed in margin.
- 2 (7) Facial ridges bare on more than upper half (figs. 16G, H). Parafacialia with 2(-3) reclinate and in female 2 proclinate setae, the reclinate setae not markedly bent outwards. Eyes bare, except in some *Meigenia*. Ocellars present.
- 3 (4) Second (and usually third) abdominal segment without discals (fig. 16K). Dorsal margin of setulose area on jowls running obliquely downward and forward (fig. 16H). Palpi pale orange. Basicosta dull orange. Propleural

¹⁷ The Voriini are very similar to the Wagneriini, and these two groups have been united by Villeneuve and by Mesnil, but the two reclinate frontal setae seem to separate them. Some Voriini have, moreover, the prosternum setulose, and some Wagneriini have a well-developed *pv* apical seta on the hind tibia. It would therefore be difficult to place both in the same section of Mesnil's system. As these three important characters (and others like the basal excavation of the abdomen, the hair of the occiput, etc.) all seem to point to heterogeneous origin, the similarity is perhaps not proof of relationship.

depression bare; thorax in posterior view appearing cinereous grey with four black vittae; abdomen uniformly cinereous grey dusted, in posterior view without paired spots. ♂: figs. 16H, K. 5.5-8.5 mm. (*Biomya* Rondani 1856, nec *Byomya* Robineau-Desvoidy, 1830).

In adult CARABIDAE of numerous genera. Kent to Somerset to Glam. to Hereford to Norfolk. (Moray ?) e. v-e. viii, woods and wastes, uncommon

Viviania cinerea Fallén.

- 4 (3) Second and third abdominal segments with discals (fig. 16L). Dorsal margin of the setulose area on the jowls bent forward at an obtuse angle at posterior lower extremity of eye and running towards vibrissa almost parallel with lower margin of head (fig. 16I). Palpi fuscous. Basicosta fuscous. Abdomen less densely and not uniformly dusted.
- 5 (6) Propleural depression bare. Apical scutellars shorter than longest hairs of scutellum, several pairs of strong erect discals present. Thorax whitish dusted with four narrow black vittae (fig. 16N); abdomen without or with slight reddish coloration laterally, with fuscous-black hind margins (fig. 16L). ♂: frons about a quarter head-width. ♀: inner ventral margins of second and third tergites contiguous and raised into a saw-like crest carrying short stout curved pointed setae (fig. 16M), a long piercer (*p*) hidden in it. ♂: figs. 16L, N. ♀: fig. 16M. 5.5-9 mm.

Parasitic in many AGROTIDAE, several GEOMETRIDAE, some LYMANTRIIDAE, LASIOCAMPIDAE, ARCTIIDAE, *Phalera bucephala* L. (NOTODONTIDAE), *Brephos parthenias* L., *Yponomeuta*, *Eurrhypara*, and occasionally sawflies (*Athalia rosae* L., *Pteronidea ribesi* Scop., *Priophorus viminalis* Fln. and a *Diprion*); abroad some TORTRICIDAE, PHYCITIDAE and OLETHREUTIDAE. A biological form which attacks almost exclusively *Bupalus piniarius* L. and which is almost always single-brooded has been separated as *B. piniariae* Hartig from the polyphagous more-brooded *nigripes* (also parasitizing *Bupalus*). Apart from some slight differences of the first larval instar, which apply to almost all specimens, no characters separating the forms have been found. An apparent difference in the width of the male frons (Sellers apud Dowden, 1933: 967) has been shown to be washed out entirely in larger series by fluctuating variation (H. F. van Emden, 1955). England and Wales, generally distributed. m. v-m. ix, woods, common

- 6 (5) Propleural depression setulose (fig. 16I, ↑). Apical scutellars fine but much longer than hairs of scutellum (fig. 16A); only one pair of distinct discal (pre-apical) scutellars. Thorax of male (fig. 16O) in posterior view largely black,

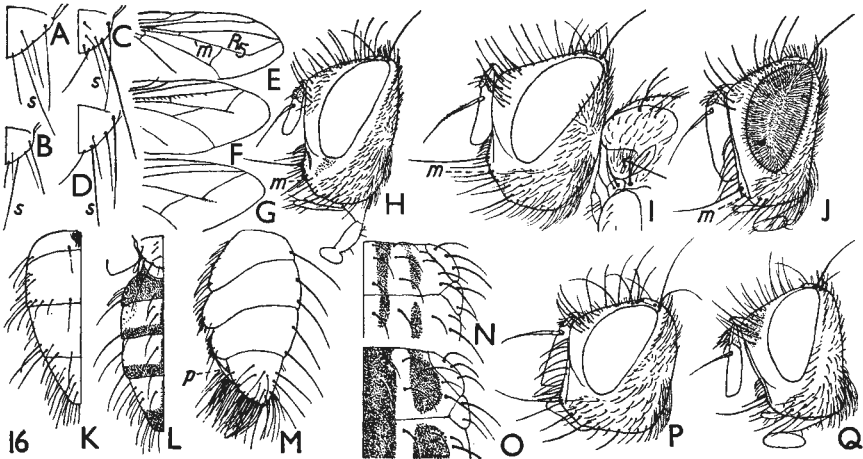


FIG. 16.

- with a pair of whitish dusted vittae along the line of *dc* (thorax of female almost as in *Blondelia*); abdomen (figs. 18L, M) with very narrow or indistinct dark hind margins but usually with a dark median line and paired dark spots. ♂: frons less than a quarter (usually hardly a fifth) head-width. ♀: abdomen without ventral crest. **Meigenia** (p. 60).
- 7 (2) Facial ridges ciliate normally on lower three-fifths or more (fig. 16j). Eyes densely hairy. Apical cross-vein never concave in posterior part, either convex or straight.
- 8 (9) Mid tibia with only 1 strong *ad* seta (see fig. 17c). Ocellars absent. 2 reclinate, and, in female, 2 proclinate orbitals. Mouth-margin not markedly projecting (fig. 16j). Prosternum setulose. Apical cross-vein forming an angle of about 130° with *m*. Palpi pale orange. ♂: frons a third head-width or slightly less. ♀: ventral margins of tergites and piercer as in *Blondelia*. Thorax whitish dusted with four black vittae; abdomen with hind margins and a narrow median vitta black, the dark bands somewhat shifting, appearing on one side much widened towards median line. ♂: figs. 16E, J. 5.7–9 mm.
- Parasite of very numerous species of Lepidopterous caterpillars, also bred from sawfly larvae of several families (e.g., Priophorus, Pteronidea, Cimbex, and a foreign Croesus and Neurotoma). Kent to Dorset to Somerset to Lancs. to Lincs. (bred b.iii), e.iii–b.ix, gardens and wastes, common*
- Comsilura concinnata** Meigen.
- 9 (8) Mid tibia with about 4–5 *ad* setae (see fig. 17D). Ocellars present. 1–2 reclinate, and in both sexes 1 proclinate, orbital seta, in addition 1–3 praer- verticals which are bent outwards (fig. 16r). Mouth-margin strongly produced between vibrissae. Prosternum bare.¹⁸ Apical cross-vein forming an angle of about 140–150° with *m*. Palpi fuscous. ♂: frons two-fifths head-width at vertex. ♀: abdomen without a saw-like ventral crest. Black and shining; thorax with beginning of 4 vittae, abdomen appearing undusted. ♂: fig. 16r. 6–8.5 mm.
- Recorded as parasite of sawfly larvae (Croesus) and beetle adults (Chryso- mela). Hants. to Cornwall. Co. Cork. Channel Is. b.vi, e.vi, e.vii– b.viii, m.ix–e.x, scarce, mainly coastal. Perichaeta unicolor* Fallén.
- 10 (1) Vibrissae level with mouth-margin (fig. 16q, 17r–h, κ–m), seldom slightly above, but eyes always virtually bare. Discals always present on abdominal segments 2 and 3 (figs. 18L–o, τ–v).
- 11 (26) R_5 open (see fig. 16E), seldom almost closed. Arista incrassate to at most about middle, never to end of second third (figs. 16q, 17r–h, κ, L). First to fourth abdominal segments with strong marginals.
- 12 (19) Facial ridges bare, except on lower third or less, bristles above vibrissa small (figs. 16q, 17r, G). Scutellum without or with only 1 pair of erect discal setae (if with several pairs, see *Blondelia*, paragr. 5). ♀: ventral edges of tergites not raised into a saw-like crest.
- 13 (18) Mid tibia with at least 3–4 *ad* setae (fig. 17D, E). 2+1 *spl*. Parafrontalia setulose (figs. 16q, 17r). Mid femora with several *a* setae near middle (fig. 17D).
- 14 (17) 2–3 *ad* setae of the mid tibiae strong, i.e., about a quarter the length of the tibia or longer, alternating with, or followed and preceded by, distinct much smaller ones (fig. 17D). *m–m* nearer to bend than to *r–m* (fig. 17A); base of r_{4+5} with several setulae.¹⁹ Palpi yellow. Thorax with whitish dust, with 4 very narrow black vittae; abdominal segments with whitish dust on about basal half or more of the segments.
- 15 (16) Apical scutellars small but distinct, crossed. Costal spine much longer than *r–m*; setulae on r_{4+5} usually extending halfway to *r–m* or farther. Parafacialia markedly wider than third antennal segment (fig. 16q), the latter hardly twice as long as second. Dark hind margins of abdominal segments occupying fully a third of the length. ♂: frons almost a third head-width. ♂: figs. 16q, 17A, D. 7–9 mm.

¹⁸ If the orbital setae differ and the apical cross-vein is concave, see TACHINIINI.

¹⁹ Base of r_{4+5} with a single strong bristle (seldom 2). Palpi fuscous. Third antennal segment only about twice as long as wide. Hind tibiae with 3 *d* preapical. See *Pelatachina* (MACQUARTINI) which sometimes has a few setulae on the prosternum.

Bred from *Tortrix viridana* L. *Camb.*: Devil's Ditch, 24.vi.36, 27.vi.36 (J. E. Collin)..... **Aporotachina angelicae** Meigen.

- 16 (15) Apical scutellars absent. Costal spine much shorter than *r-m*; setulae on τ_{4+5} confined to region of node. Parafacialia at narrowest part at most as wide as third antennal segment, the latter about thrice as long as second. Dark hind margins of abdominal segments occupying a quarter to almost a third of length. ♂: frons less than three-tenths head-width. 7-10 mm.

Bred from *Deilephila porcellus* L. (SPHINGIDAE), *Notodonta anceps* Goeze (NOTODONTIDAE) and a foreign AGROTID. Probably not British.

Dexodes albisquama Zetterstedt.

- 17 (14) Only 1 *ad* seta of mid tibia strong, preceded by 1-2 short ones but not followed by any other setae (fig. 17E). *m-m* at middle between bend and *r-m* (fig. 17B), costal spine indistinct or absent. Palpi fuscous. Parafacialia much narrower below than third antennal segment (fig. 17F), the latter 3(♂)-4(♀) times as long as wide and reaching mouth-margin. Scutellum without distinct discal, preapical or apical setae. Abdominal segments with hardly basal third faintly whitish dusted. Frons almost to fully a third head-width and with proclinate orbitals in both sexes. ♂: figs. 17B, E, F. 5-7 mm. (*Hypostena procera* auct. nec Meigen; *Apatelia* Stein; *Apatalina* Enderlein.)

Parasite of adult *Haltica* (CHRYSOMELIDAE). *Kent to Hants. to Hereford. to Worcs. to Herts.* "vi," b.vii-b.viii, rare. . . **Arrhinomyia innoxia** Meigen.

- 18 (13) Mid tibia with only 1 strong *ad* seta (fig. 17C). 1+1 *stpl.* Parafrontalia bare except for 1-2 setulae close to frontal row (fig. 17G). Mid femur with a single strong *a* seta near middle. *m-m* at middle between bend and *r-m*; costal spine strong. Palpi fuscous. Parafacialia much narrower below than third antennal segment and arista, including hair, fully half as wide as it (fig. 17C). Scutellum without apicals. Thorax with white dust on lateral part only, abdominal segments conspicuously white dusted on basal fifth or fourth. ♂: frons about an eighth head-width. ♂: figs. 17C, G. 5-6 mm.

Hosts unknown. *Sussex to Cornwall (to Hereford. to Suffolk ?)* b.vi, b.viii, rare

Medoria anthracina Meigen.

- 19 (12) Facial ridges with rather strong and suberect ascending setae on lower two-fifths or more (figs. 17H, K, L).
- 20 (23) Mid tibia with only one strong *ad* seta (see fig. 17c), and parafacialia bare (fig. 17H). Apical scutellars absent or hair-like.
- 21 (22) Occipital dilation obsolete anteriorly, where it carries some fine inconspicuous black hairs and an outstanding strong seta (fig. 17H, *od*). Dorsal basal excavation of abdomen not or hardly reaching level of marginals (fig. 17I). Thorax densely whitish grey dusted with four undusted vittae (fig. 17i);

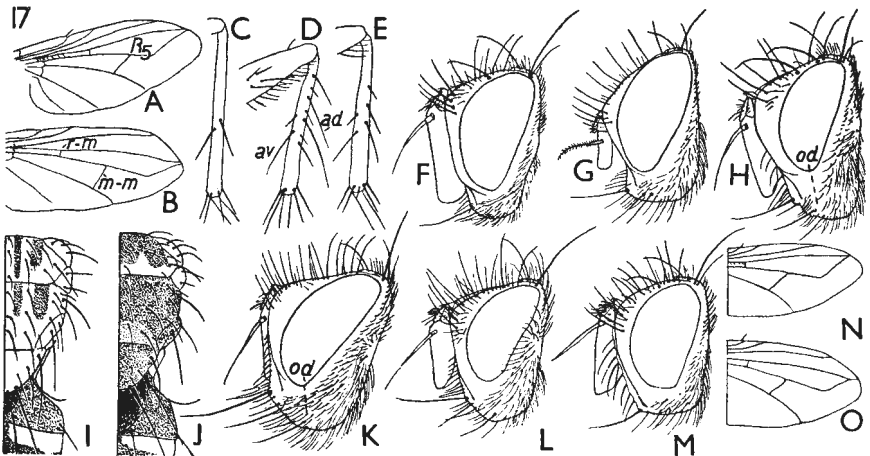


FIG. 17.

abdomen with a median vitta and more than basal half of the segments whitish dusted. ♂: frons with strong proclinate frontal setae, about one-third head-width at vertex. ♀: ventral margins of tergites raised and forming a saw-like crest (as in *Blondelia*). ♂: figs. 17H, I. 4.5-7 mm. (*muscaria* auct. nec Fallén.)

Hosts unknown according to Dr. K. G. Blair (the record in Audcent, 1942, refers to Oswaldia, of which an adult was found with Coelocrabro without obviously indicating parasitism). Sussex to Hants. to Hereford. to Worcs. to Middx. e. vi-e. viii, scarce. . . .

- Microvibrissina villeneuvei** Wainwright.
Occipital dilation well developed and rounded anteriorly with conspicuous setulose hairs and without an isolated striking seta (fig. 17K, od). Dorsal basal excavation of abdomen (fig. 17J) closely approaching hind margin of first segment, almost always exceeding level of marginals. Thorax (fig. 17J) with a large black median patch before suture, the hind margin of which has 3 or 5 pale-dusted indentations, and with a broad and complete black post band; abdomen largely black with whitish dust at base of each segment except at middle. ♂: frons without proclinate orbitals (fig. 17K), about one-fifth to one-seventh head-width at vertex. ♀: ventral margins of tergites normal. **Degeeria** (p. 61).
- 22 (21) Mid tibia almost always with two or more *ad* setae (see fig. 17E); if the proximal one is very small or absent, the parafacialia setulose on more than upper half. *prst ia* normally present. Dorsal basal excavation of abdomen not or hardly exceeding middle of first segment.²⁰ 2+1 *spl.* Base of r_{4+5} with only a few setulae on node. Occipital dilation slight and broad, face strongly receding (fig. 17L, 19A-C).
- 23 (20) Praevertical seta absent (fig. 17L). Parafacialia bare. Lower anterior end of occipital dilation with 1-2 striking long setae. Fuscous black, not very thickly whitish grey dusted, thorax with four narrow vittae; abdominal segments with the basal two-thirds (♂) or a narrow basal band which broadens to sides (♀) whitish grey dusted. ♂: frons at vertex one-third head-width, without proclinate orbitals. ♂: fig. 17L. 5-8 mm. (= *Ceromasia sordidissima* auct. nec Zetterstedt.)
- Recorded from GEOMETRIDAE (Itama wauaria L., Entephria caesiata Schiff.), an AGROTID (Acronycta alni L.) and vaguely assumed (Collins, 1926, Ent. mon. Mag. 62: 61) to parasitize a DELPHACID (Criomorphus pteridis Boh.) England, generally distributed. Wales: Caern., Merioneth. e. iii-e. vi (m. ix), in woods, sometimes common.*
- 24 (25) Praevertical seta present (figs. 19A-C). Parafacialia setulose on more than upper half of inner part. Lower anterior end of occipital dilation without striking setae, the setulose hairs gradually becoming longer to mouth margin **Trichopareia** (p. 62).
- 25 (24) R_5 closed or petiolate (figs. 17N, o); if only closed, the arista thickened almost to tip (fig. 17M). Facial ridges with setae ascending to middle or beyond and usually almost or fully reaching level of descending frontal setae (fig. 17M). Frons at vertex in both sexes a third head-width or more. Face strongly receding below. Antennae very long, especially in male.
- 26 (11) R_5 closed in margin (fig. 17N); base of r_{4+5} setulose almost or fully to *r-m*; *m-m* as oblique as apical cross-vein. Mid tibia with about 3 *ad* setae which are stronger than the strongest *pd*. Arista thickened almost to tip (fig. 17M). Vertex more than two-fifths head-width. Thorax with four linear undusted vittae; tergites with the basal fifth to fourth densely silver white dusted. ♂: figs. 17M, N. 5-6.5 mm.
- 27 (28) *Parasite of Monoctenus juniperi L. (Hym. Diprion.). Only one doubtful old British record (Burnley, Lancs., viii. W. G. Clutton; Piffard det.)*
- 28 (27) R_5 with a stalk about as long as *r-m* (fig. 17O); base of r_{4+5} with only a few setulae on and near node; *m-m* less oblique than apical cross-vein. Mid tibia with only 1 strong *ad* seta, in addition often one or more setae present which are shorter than the strongest *pd*. Vertex about a third

²⁰ Dorsal basal excavation of abdomen exceeding middle of first segment considerably; r_{4+5} setulose to about *r-m*; occipital dilation narrow and rather conspicuous; see *Staurochaeta*, paragr. 27.

head-width. Thorax with some whitish dust in front of suture; abdomen without distinct whitish dust; first segment with marginals, the basal dorsal excavation not or slightly passing middle (fig. 18b). Apical scutellars fine but conspicuous, diverging (fig. 18, b, d). ♂: proclinate orbital setae present.

- 29 (30) Setae on facial ridges hardly reaching middle, descending frontal setae about reaching apical level of second antennal segment, widely separated from the former setae, but small black setulae on the parafacialia bridging the gap. Stalk of R_5 and costal spine not longer than $r-m$. Scutellum with shorter and longer decumbent hairs but without erect setae on disc. 4-4.5 mm. (= *Erynnia nitida* Robineau-Desvoidy of Rondani, nec Robineau-Desvoidy; = *Anachetopsis nitidula* Villeneuve).

Parasite of the larva of Galerucella luteola Müll. Audcent (1942) mentions this larva as the only host of "*Erynnia nitida*" but only on the basis of Continental records. According to Wainwright (1940) the British species is the true *Erynnia nitida*²¹, a parasite of LEPIDOPTERA (see p. 82), and I have seen no British specimens or records of the present species.

- 30 (29) Setae on facial ridges stronger, conspicuously exceeding middle and ascending to about level of descending frontal setae, which reach or exceed level of arista; parafacialia quite bare. Stalk of R_5 and costal spine about twice the length of $r-m$. Scutellum with several pairs of conspicuous erect discal setae; one of them on anterior half. ♂: figs. 18b, d, f. 3.8-5.5 mm. (= *ocypterina* Zett. auct. nec Zett.).

Parasite of Pterophoridae; also recorded from the pink cotton bollworm Pectinophora gossypiella Saund. Kent to Devon to Pembro. to Westmorland to Yorks. e. v-e. viii, woods and marshes

Anachetopsis zetterstedti Ringdahl.

Genus *Meigenia* Robineau-Desvoidy, 1830.

The species have never been very clearly distinguished, and it is uncertain to which forms published localities, hosts, etc., refer. It is also doubtful whether the characters used by Wainwright and adopted here will always allow the forms to be separated.

- 1 (2) Eyes densely haired, the hairs $1\frac{1}{2}$ -2 times as long as the diameter of an ocellus (fig. 18g). ♂: arms of superior forceps (in normal position on the specimen in ventral view) strongly diverging so as to form a V; inferior forceps

²¹ It differs by the *pra* being subequal in length to the first *post dc*, the dorsal basal excavation of abdomen reaching hind margin of first tergite, etc.

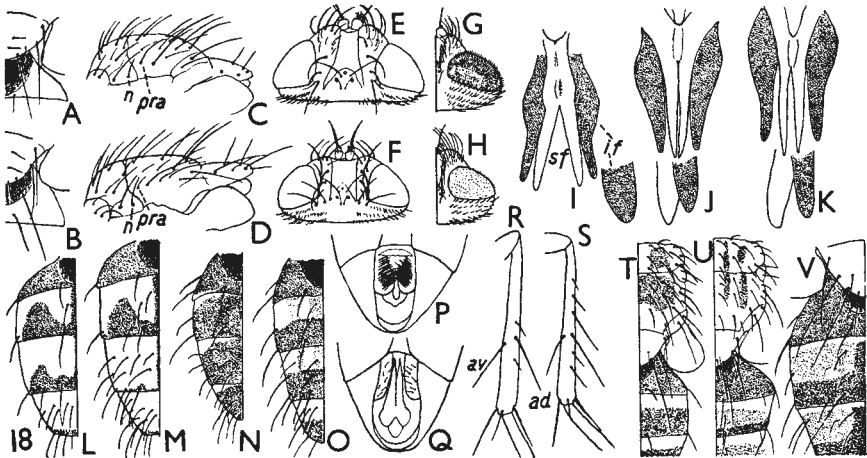


FIG. 18.

elongate elliptical with broadly rounded apex and hardly narrowed apical part (fig. 18i). ♂: figs. 18g, i. 6-7 mm. (*Mystacella* Wulp, 1890.)

Channel Is.: Jersey, 15.ix.46, Wainwright. Sussex: Lewes, 1866. Somerset: Felton Common, 28.viii.37; Kent: Sandwich Bay, 10.viii.50. (Other English records—Surrey; London (Dulwich)—refer probably to bisignata.) **majuseula** Rondani.

2 (1) Eyes almost bare, the hairs being sparse and shorter than the diameter of an ocellus (figs. 16i, 18E). ♂: arms of superior forceps (in normal position on the specimen and ventral view) closely adjacent and almost or quite parallel (figs. 18j, k).

3 (4) Superior and inferior forceps in lateral view straight and not diverging from one another at apex (fig. 18j); inferior forceps broad and strongly wedge-shaped, tapering to a somewhat blunt point; both with numerous long hirsute hairs, which are considerably longer than width of forceps. Abdomen with paired spots on both the second and third segments. Figs. 16i, 18j. 6 mm. *Bred from Phytodecta rufipes Degeer. Kent to Devon to Caern. to Suffolk. m.v-m.vi, b.vii-b.x, especially on chalk* **pilosa** Baranoff.

4 (3) Superior and inferior forceps not quite straight in lateral view, inferior forceps somewhat curved towards body, superior one somewhat curved away from body, apices thus diverging (fig. 18k); inferior forceps more parallel-sided and narrower, with rounded tip, superior forceps with a slightly thickened (truncate) tip; hairs short and inconspicuous, not hirsute, most of those on superior forceps shorter than its width except at base, most of those on inferior forceps, especially all those directed towards body, shorter than width of inferior forceps.

5 (6) Length 3 to just over 5 mm. Second and third abdominal segments each with a pair of spots, which usually coalesce behind with median vitta (var. *floralis* auct. nec Fallén). ♂: figs. 18H, L.

The host records for this and the following form cannot be separated; they have been recorded from CHRYSOMELID larvae (CRICERINAE, CHRYSOMELINAE, GALERUCINAE), sawfly larvae, Lepidopterous larvae and Chorthippus (ACRIDIDAE). Surrey to Cornwall to Pembs. to Hereford. to Notts. to Yorks. Inverness., Moray. e.iv-e.viii, woods, sometimes common. **mutabilis** Fallén.

6 (5) Length as a rule 6-8 mm. Third abdominal segment usually without paired spots, but if they are present they do not coalesce with the median vitta; those on the second segment as a rule present, separated from median vitta. Male appearing greyer owing to a reduction of the markings. ♂: figs. 16A, O, 18K, M.

Kent to Cornwall to Glam. to Staffs. to Notts. to Yorks. Moray. m.v-m.ix **bisignata** Meigen.

Genus **Degeeria** Meigen, 1838 (= ? *Medina* Robineau-Desvoidy, 1830, auct.).

1 (2) 3.4-5.5 mm. Halteres fuscous. Abdomen almost without whitish-dusted bands (fig. 18N), pollinosity thin and restricted to at most basal third (♂) or half (♀) of lateral surface. ♂: hind end of lobes of fourth ventrite somewhat raised and with a dense tuft of erect setulose hairs, the tufts of the two sides somewhat converging (fig. 18P). ♀: both the inner and outer verticals well developed. ♂: figs. 18N, P. (= *pulchella* Meigen, *funebria* Meigen.)

Parasite of adult CHRYSOMELIDAE (Plagiodera, Agelastica, Haltica), also recorded from larvae of Peronea maccana Tr. (TORTRICIDAE) and Eucosma sordidana Hb. Hants. to Dorset. to Glam. to Hereford. to Suffolk. e.v-e.vi, e.vii-e.viii, woods, sometimes abundant. **luctuosa** Meigen.

2 (1) 4.3-8.5 mm. Halteres pale reddish yellow. Abdomen with conspicuous whitish-dusted bands (fig. 18o), pollinosity quite dense and occupying whole basal width of segments 2-4, except for a narrow black median vitta, and half the length or a little more on lateral surface. ♂: fourth ventrite simple without tufts of dense hairs (fig. 18q). ♀: outer vertical seta indistinct or absent. ♂: figs. 17j, k, 18o, q.

Parasite of adult CHRYSOMELIDAE (Galerucella luteola Müll. and Lochmaea suturalis Thoms.). England, Wales, Scotland, generally distributed. Co. Cork. m.v-b.viii, m.ix, heaths and coastal wastes **collaris** Fallén.

Genus *Trichopareia* Brauer & Bergenstamm, 1889.

Most authors who have dealt with this genus have remarked that there is hardly any difference between it and *Admontia* Brauer & Bergenstamm, 1889. As *T. blanda* is certainly less similar to *T. seria* than the latter to *Admontia podomyia* the species can more satisfactorily be keyed out if the two genera are united. Parasites of leatherjackets (larvae of TIPULIDAE).

KEY TO SPECIES.

- 1 (4) Mid tibia (fig. 18R) with only 1 strong *ad* (and sometimes a small one basad, another small one sometimes distad, both not longer than the *pd* setae). Apical scutellars absent or hair-like (figs. 18T, U). Second abdominal segment usually with only one pair of marginals and discals (figs. 18T, U). Second segment of arista up to about twice as long as wide (figs. 19A, B).
- 2 (3) Thorax on each side with only one black vitta, which is broad and carries along its middle the *dc* (fig. 18T). Parafacialia at narrowest part two-thirds (σ) to fully (φ) as wide as third antennal segment (fig. 19A); setulose to lower level of eye. Mid tibia with 1-2 small *ad* setae in addition to the strong one (fig. 18R). σ : figs. 18R, T, 19A. 4-7 mm.

Hants., Monmouth., Hereford., Salop?, Cambs., Suffolk, Norfolk, Westmorland. Argyll., Perth., Inverness., Aberdeen. b.vii-m.viii (vi-x, *C. D. Day*) ***blanda*** Fallén.

- 3 (2) Thorax on each side with two black vittae (fig. 18U), the paramedian ones narrow and separated from the broader, but interrupted, outer ones by a whitish-dusted stripe, on which the *dc* are situated. Parafacialia at narrowest part hardly half as wide as third antennal segment, bare on lower quarter or third (fig. 19B). Mid tibia with only 1 *ad*. σ : figs. 18U, 19B. 5-7 mm.

Bred from Dictenidia bimaculata L. (H. Main; Marg. van Emden !!). Essex: Epping Forest, bred v.21 (H. Main); Buckhurst Hill, bred e.v.48 (host coll. by J. F. Shillito !); Hants.: New Forest, 19.viii.39 (J. E. Collin !) ***decorata*** Zetterstedt.

- 4 (1) Mid tibia with 2-4 strong *ad* setae, at least two of them conspicuously longer than the *pd* setae (fig. 18S). Thorax with two pairs of black vittae as in *decorata* (see fig. 18U).

- 5 (6) *pd* preapical of hind tibia shorter than the *d* one (fig. 19D). Apical scutellars absent or hair-like, shorter than the preapical setae. Second abdominal segment with only one pair of marginals and discals. Abdomen with dense pale, often golden, grey pollinosity which almost reaches the hind margin of the segments and which shows shifting spots. Figs. 18S, 19D. 5.5-8 mm.

Parasite of wood-boring leatherjackets of the genera Dictenidia, Ctenophora and Tanyptera. Hants., Glam. to Warwks., Ches. to Notts. to Perth. m.vi-e.vii ***seria*** Meigen.

- 6 (5) *pd* preapical of hind tibia longer than the *d* one (fig. 19E). Apical scutellars distinct, longer than the preapical setae (fig. 18V). Second abdominal segment usually with one or several pairs of erect marginals besides the main pair and the discals, abdomen with silver-white pollinosity, which is dense on a very narrow basal band and at sides, and thinner on anterior half of disc. Width of jowls (fig. 19C) about as long as smaller diameter of the eye (in *T. grandicornis* Zetterstedt = *podomyia* Brauer & Bergenstamm, which is apparently not British, about half that length). σ : figs. 18V, 19C, E. 5-8 mm. (*Admontia* Brauer & Bergenstamm.)

Merioneth. Inverness to Aberdeen. (Hereford., Salop ?, and probably Notts. in Wainwright refer to blanda.) m.vi-b.vii, b.viii

amica (Meigen ?), Villeneuve.

Tribe SIPHONINI.

KEY TO GENERA.

- 1 (4) r_{4+5} with only 1(-2) setulae on node; other veins bare (figs. 19F, G). Mid tibia with only 1 *ad* seta (fig. 19I, J); legs wholly black. First abdominal

segment without marginals, second and third without discals (see fig. 19F). Wholly fuscous black with some grey dust. Length below 5 mm.

- 2 (3) Apical cross-vein and *m-m* present, *m* reaching margin at or very little before apex (fig. 19F). Halteres pale reddish yellow. Setae on facial ridges reaching about lower third. *ad* of mid tibia almost at apical third (fig. 19I). Abdomen with narrow but conspicuous basal bands of greyish-white dust. Lower calyptera somewhat smoky. Figs. 19F, I. 3.5-4.8 mm. (= ? *Elfia* Robineau-Desvoidy 1850).

Recorded as parasite of *Oecophora* (*Esperia*) *sulphurella* F. and *Tinea granella* L. (*K. G. Blair*!) and *cloacella* Hw. Kent to Devon, to Hereford to Sutherland. b. iv-b. vi, e. vi-b. ix, b. x. . . *Craspedothrix zonella* Zetterstedt.

- 3 (2) Apical cross-vein and *m-m* absent, *m* incomplete and quite straight from *r-m* onwards and falling short of margin by 3-4 times the length of *r-m* (fig. 19G). Halteres fuscous. Setae on facial ridges ascending at least almost to middle. *ad* of mid tibia hardly distad of middle (fig. 19J). Abdomen without trace of pale-dusted bands, but with very narrow brown-dusted bands at extreme base of lateral surface: ♂: figs. 19G, H, J. 2.7-4.3 mm.

Parasitic in caterpillars of *Heterocerous Lepidoptera* (*Colotois pennaria* L., GEOMETRIDAE, *Adama microdactyla* Hb., PTEROPHORIDAE, *Gypsonoma neglectana Dup.*, and *Eucosma triquetrana Hw.*, OLETHREUTIDAE). Kent to Cornwall to Merioneth. to Herts. Aberdeen., Sutherland. e. iv-m. viii

Phytomytera nitidiventris Rondani.

- 4 (1) r_{4+5} setulose almost to *r-m* or beyond (figs. 19L, Q, R).
5 (6) Mid tibia with several strong *ad* setae (fig. 19K). Second and third abdominal segments with strong though somewhat irregular discals (fig. 19O). Sub-apical scutellars about as widely separated from each other as from base (fig. 19M). Setulae on r_{4+5} reaching about *r-m* (fig. 19L). Legs, palpi, base of antennae, and interfrontalia pale ferruginous, the posterior part of the interfrontalia, and parts of the femora infuscate. Densely pale grey dusted, thorax with three broad suffused brown-dusted vittae, abdominal segments with a median vitta and broad suffused spots, which tend to fuse with the median vitta (fig. 19O). ♂: figs. 19K-M, O. 4.5-6 mm. (*Thryptocera* auct. nec Macquart, *Euthryptocera* Townsend, *Ceromyia* auct. nec Robineau-Desvoidy.)

Parasite of *Malacosoma neustria* L. and *Drepana lacertinaria* L. Gloucs.: Cheltenham; Bucks.: Langley; Essex: Colchester. b.-m. v

Ceranthia versicolor Fallén.

- 6 (5) Mid tibia with only 1 *ad* seta (see figs. 19I, J). Abdominal segments without discals. Subapical scutellars much closer to each other than to base (fig. 19N).
7 (8) Proboscis of normal length, straight, about half as long as height of head, with normal broad soft labella *Actia* (p. 63).
8 (7) Proboscis long and thin, strongly elbowed, in resting position doubled back, about twice as long as height of head; labella filiform, longer than mentum. Sixth vein reaching margin of wing *Siphona* (p. 67).

Genus *Actia* Robineau-Desvoidy, 1830.^{21a}

- 1 (10) Only r_{4+5} with setulae (figs. 19Q, R, 20B).
2 (3) Lower prostigmatal strong and strongly curved downward (fig. 19T ↑).

^{21a} In 1850 (*Ann. Soc. ent. Fr.* (2) 8: 190) Robineau-Desvoidy removed one of the original two species (his *cingulata*) to a new genus *Elfia* "intermédiaire aux Néeres et aux Acties" (Robineau l.c.), which "de toute évidence" (Mesnil 1954, *Explor. Parc Nat. Albert, Mission de Witte*, fasc. 81: 5) appears to equal *Craspedothrix*, and restricted *Actia* in the next instalment of the same work (1851, *Ann. Soc. ent. Fr.* (2) 9: 185) to the second species *A. pilipennis* Robineau-Desvoidy (nec Fallén) and a new one, thus making his original genus *Actia* monotypic and thereby fixing *pilipennis* as its type. Mesnil's conclusion (1954, p. 5) that the genotype of *Actia* is *cingulata* and that the name *Actia* must be transferred to *Craspedothrix* whilst for the large and important genus *Actia* other names must be found, is thus untenable.

Femora piceous. r_{4+5} setulose to well beyond $r-m$; $m-m$ much closer to $r-m$ than to bend (fig. 19Q). Scutellum fuscous with the tip sometimes testaceous. Halteres pale reddish yellow. Palpi and basal antennal segments pale ferruginous, tibiae translucent testaceous. Thorax without distinct traces of vittae; tergites fuscous with the basal fourth or so whitish grey dusted (fig. 19P). ♂: third antennal segment cleft nearly to base, so as to appear duplicated in lateral view. Figs. 19R, Q, r. 3.5-4.5 mm.

Parasite of Ourapteryx sambucaria L. Hants., New Forest; Somerset: Clevedon; Gloucs.: Coombe Dingle; Blaise Castle; Middx: Finchley (C. H. Andrewes !); Inverness.: nr. Grantown. b. v, b. vi, b. vii-b. viii

fissicornis Strobl.

- 3 (2) Lower prostigmatal hair-like or more or less strong, in the latter case curved upward like the upper prostigmatal (fig. 19U ↑). Femora and scutellum wholly testaceous, if the setulae on r_{4+5} exceed $r-m$.
- 4 (5) Shoulders, scutellum, abdomen and legs pale testaceous to pale ferruginous: antennae, including arista, of the same colour, with the larger apical part of the third segment browned. Setulae on r_{4+5} far exceeding $r-m$ (see fig. 19Q). Second segment of arista about twice as long as wide at apex (fig. 19U); parafacialia setulose on upper third. Figs. 19N, v. 4.5-6.4 mm.
- Parasite of Heterocerous Lepidoptera (Eriogaster lanestris L., Lasiocampa quercus L., Eupithecia denotata Hb., Scardia boleti F.). England, Scotland, widely distributed. e. iv, e. v-e. ix, on heathland birches. bicolor* Meigen.
- 5 (4) Shoulders, most of scutellum and of abdomen fuscous, and at least fore femora largely infuscate; third antennal segment and arista largely fuscous. Setulae on r_{4+5} not or hardly exceeding $r-m$ (fig. 19R, 20B); often rather strong. Second segment of arista at least thrice as long as wide at apex, usually longer (fig. 19s).
- 6 (9) Only second and third segments of arista elongate (fig. 19s); parafacialia setulose on upper third or half.
- 7 (8) Femora black with reddish knees. Halteres fuscous.²² Sixth vein fading out one-fifth of its length from margin. Parafacialia thrice as wide as

²² If halteres pale testaceous, abdomen wholly dark in ground-colour, third antennal segment very large and broadened, see *verralli*, in which the setulae on r_1 may be rather indistinct.

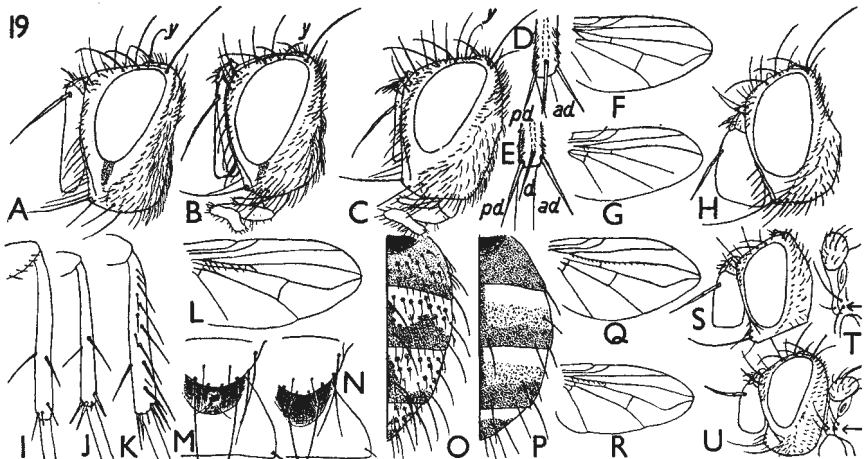


FIG. 19.

arista. Thorax densely pale grey dusted, with vestiges of 3 brown vittae; abdomen densely dusted, hind quarter or fifth of the first 3 segments fuscous-brown. r_{4+5} with only 5-8 rather long and strong setae, which are evenly spaced from node to $r-m$. Setae of thorax long and strong; 3 (-4) *post dc*. ♀: fore tarsi not dilated. 6 mm.

Parasite of AGROTID larvae ("Polia flavicincta F."). Only one British specimen known: Dorset. : Coombe Wood, nr. Wool. 8.v.49, on wood spurge, C. D. Day.....*exoleta* Meigen.

- 8 (7) Femora largely testaceous with browned tips; dorsal surface of the fore femora wholly browned; femora sometimes more extensively browned. Halteres pale testaceous. Sixth vein reaching wing margin. (fig. 19R). Parafacialia somewhat wider than arista (fig. 19S). 3 *post dc* (type form) or 4 *post dc* (var. *lichtwardiana* Villen.). Thorax not very densely dusted, with vestiges of 4 narrow, darker grey vittae; abdomen testaceous translucent²³ on basal lateral part of proximal segments, narrowly or indistinctly in female but broadly in male (fig. 20N). Otherwise like *exoleta*. ♂: figs. 19R, S, 20N. 3-4.5 mm.

- Bred from *Cosymbia annulata* Schultz and *Acasis viretata* Hb. (GEOMETRIDAE). *Salop to Perth. to Sutherland*. m.vi-b.viii. *anomala* Zetterstedt. 9 (6) First segment of arista almost or fully as long as second, arista therefore bent twice (fig. 20A); parafacialia bare, not wider at middle than arista at base; setulae of parafrontalia not or hardly exceeding frontal setae in front. Halteres infuscated. Sixth vein falling considerably short of wing margin (fig. 20B). Wholly fuscous, rather densely pale grey dusted; legs pale testaceous with tarsi browned and femora partly infuscated. ♂: figs. 20A, B. 3.4-4.5 mm.

Hosts unknown. Sussex to Devon, to Worcs. to Cambs. b.v-b.vi.

nigrohalterata Villeneuve.

- 10 (1) At least the apical section of r_1 setulose (figs. 20C, D, F) on dorsal surface (in *verralli* with very few setulae). Lower prostigmatal hair-like or, if more or less strong, curved upward like the upper prostigmatal (fig. 19U ↑).
11 (14) Fifth vein bare (fig. 20C). r_1 with setulae on dorsal surface of apical (upcurved) part only. Halteres pale reddish yellow.
12 (13) Legs, most of third antennal segment, parafrontalia, and scutellum, except for its extreme tip, fuscous in ground-colour like the body; interfrontalia rufous-brown and only slightly wider than a parafrontale (fig. 20I). Second segment of arista about twice as long as wide; third antennal segment of normal size (fig. 20G). Sixth vein not nearly reaching margin of wing. Abdomen with thicker pale grey dust at extreme base of segments, extending more thinly to beyond middle (fig. 20O). ♂: figs. 20G, I, O. 3.4-5.3 mm.

Host: Monopis rusticella Clk. (TINEIDAE). *Surrey to Cornwall to Hereford. to Norfolk*. e.vi-b.ix.....*antennalis* Rondani.

- 13 (12) Legs, antennae, parafrontalia and apical half of scutellum largely pale ferruginous to testaceous; interfrontalia orange yellow, more than twice as wide as a parafrontale (fig. 20J). Second segment of arista about four times as long as wide, third antennal segment very large (fig. 20H). Sixth vein reaching margin of wing (fig. 20C). Thorax and abdomen fuscous with cinereous dust, abdomen in posterior view with a narrow dark median vitta and on the third segment a pair of shifting spots. ♂: figs. 20C, H, J; cover drawing. 5 mm.

Hosts unknown. Sutherland: The Mound; Inverness: nr. Grantown; Salop: Whixall Moss. m.vii-b.viii.....*verralli* Wainwright.

- 14 (11) Fifth vein with some black setulae on dorsal surface from base of discal cell onwards and sometimes extending beyond apex of that cell (figs. 20D-F).
15 (16) Apical cross-vein absent, m straight from $m-m$ to tip and falling short of wing margin by about thrice length of $r-m$ (fig. 20D); last section of fifth vein as a rule more than twice as long as $m-m$; r_1 setulose on dorsal surface of middle and apical thirds. Palpi fuscous. Thorax (fig. 20K) grey dusted with 4 linear dark brown vittae; abdomen fuscous with very narrow silver white basal bands interrupted at middle (fig. 20P). ♂: figs. 20D, K, P. 3.2-5.3 mm. (= *lamia* Meigen).

Parasite of Lasiocampa quercus L. (LASIOCAMPIDAE), *Eucosma pflugiana* F., *Laspeyresia cosmophorana* Tr. (OLETHREUTIDAE), *Ourapteryx sambu-*

- caria L. (GEOMETRIDAE). *Kent to Cornwall to Hereford. to Warwks. to Oxon.* b. v-e. vii, "viii," woods and marshes. **frontalis** Macquart.
- 16 (15) Apical cross-vein present and reaching wing margin, *m* therefore with the normal bend (figs. 20E, F); last section of fifth vein less than twice as long as *m-m*. Palpi pale orange.
- 17 (18) r_1 setulose on dorsal surface of only apical third (see fig. 20c). Antennae, including arista, orange, third antennal segment hardly browned. Coloration as in *frontalis*. 4-5.8 mm. (= *pilipennis* Fallén of Villeneuve).
Parasite of *Evetria buoliana* Schiff. and *resinella* L. (OLETHREUTIDAE).
Surrey: Weybridge; Hants.: Aldershot; Suffolk. m.vi-b.vii
- 18 (17) r_1 setulose on dorsal surface of middle and apical thirds, i.e., nudibasis Stein. from origin of r_3 onwards (see fig. 20d).
- 19 (20) Thorax and abdomen shining reddish yellow, legs pale testaceous; antennae pale ferruginous with the third segment largely browned and apex of arista infuscate. r_1 setulose on middle and apical thirds of dorsal, and apical third of ventral surface; setulae on fifth vein reaching *m-m*. 3 strong *post dc.* 5 mm.
Hosts unknown. Cambs.: Chippenham Fen, 9 dates between 10.vi and 27.vii. **silacea** Meigen.
- 20 (19) Thorax and abdomen fuscous in ground-colour. Antennae fuscous, the arista at least infuscate, dorsal edge of third antennal segment convex or straight.
- 21 (22) Third segment of arista tapering from basal sixth or eighth onwards, incrassate part brownish orange, much paler than its pubescence (fig. 20L). Setulae on fifth wing vein reaching *m-m* (fig. 20E); r_1 setulose normally on dorsal surface only; apical cross-vein virtually straight in apical half. 4 *post dc.* ♂: figs. 20E, L, Q. 3-5 mm. (= *reducta* Villeneuve).
Parasite of many TORTRICIDAE (*Tortrix viridana* L., *Sparganothis pilleriana* Schiff., *Peronea logiana* Schiff., *P. hastiana* L., *P. aspersana* Hb. (*Blair, i.l.*), *Argyrotoza bergmanniana* L. (!), *Cacoecia pronubana* Hb., *Ditula angustiorana* Haw.), EUCOSMIDAE (*Eucosma sordidana* Hb., *Argyroplloe schulziana* F., *Evetria buoliana* Schiff., *resinella* L.), OECOPHORIDAE (*various* Depressaria), HYPONOMEUTIDAE (*Hyponomeuta euonymellus* L.), PHYCITIDAE (*Dioryctria abietella* Schiff., *splendidella* H.-S.) and occasionally larger HETEROCERA (*Euproctis phaeorrhoea* Don., *Orthosia gracilis* Schiff.).
England, Wales (Sussex to Cornwall to Caern. to Notts.), Scotland (Perth to Sutherland). Co. Kerry. m.iv-e.viii, ix, x, woods, very common
- pilipennis** Fallén.

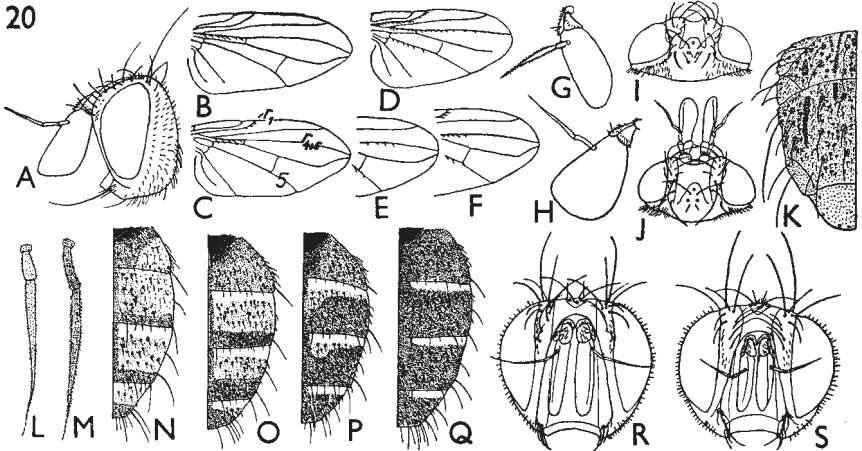


FIG. 20.

- 22 (21) Third segment of arista parallel-sided on basal two-fifths, incrassate part dark brown, hardly paler than its pubescence (fig. 20m). Setulae on fifth vein not reaching *m-m*; *r*₁ setulose on dorsal surface and on apical third of ventral surface (fig. 20n); apical cross-vein markedly concave towards apex. Figs. 20F, M. 4-5.3 mm.

Parasite of various TORTRICIDAE (*Tortrix viridana* L., *Cacoecia oporana* L., *xylosteana* L.), *EUCOSMIDAE* (*Evetria buoliana* Schiff. and *resinella* L.), *OECOPHORIDAE* (*Depressaria appiana* F. and *putridella* Schiff.), *PHALONITIDAE* (*Phtheochroa rugosana* Hb.), *GLYPHIPTERYGIDAE* (*Anthophila pariana* Clerck) and *PTEROPHORIDAE* (*Oidaematophorus lithodactylus* Tr.). *England, Wales, Scotland (to Inverness. and Skye), generally distributed. e.v-b.ix, woods and gardens, very common. crassicornis* Meigen.

Genus *Siphona* Meigen, 1803.

(= *Crocota* Meigen, 1800, = *Bucentes* Latreille, 1809.)

Siphona has by some authors been referred to the Stomoxydine genus *Lyperosia* Rondani. However, Meigen's description of the proboscis and arista shows beyond doubt that his "*Stomoxyis irritans* F." in 1803 was a species of the present genus and not *irritans* of Linnaeus and Fabricius.

The species are variable and difficult to name. On certain localities special forms are found, and a thorough study over the whole of Europe might show that some of these are separate species. *S. maculata* is fairly easily recognised though containing several local forms. Discrimination between *geniculata* and *cristata*, on the other hand, will not always be easy, and it is not improbable that all three species interbreed.

There are often several larvae in one host specimen, attached to the main tracheae.

KEY TO SPECIES.

- 1 (2) Eyes (in facial view, the upper margin of the anterior ocellus to be kept level with the lower margin of the posterior ones) not reaching level of vibrissae (fig. 20R). Normally: 3 *post dc*; first tergite without marginals (fig. 21A), parafacialia with only 2-4 very small setulae very close to the descending setae; second segment of arista longer than apical diameter of second antennal segment; mentum shorter than height of head; thorax with traces of three vittae; abdominal segments with rather large paired fuscous spots (fig. 21A). ♂: figs. 20R, 21A. 3-4.7 mm.

Parasite of Mamestra brassicae L., see also under *cristata*. *England, Wales, Scotland (to Ross). e.iii, e.iv-m.viii, wastes, locally common*

maculata Staeger

(Odd specimens may have 4 *post dc*, or small marginals on the first tergite, or the second arisal segment shorter, etc. A series from Scottish localities deviates by the mentum being fully as long as height of head; 15 specimens from Cambs. and Norfolk have the mentum one-fifth to one-quarter longer than that height, 4 *post dc* and the jowls narrower; etc., etc. A series named *flavifrons* Staeger by Wainwright—from Devon., Lancs. and Scottish counties—is considerably larger—4.6-5.8 mm.—mentum slightly longer than height of head, the majority have 4 *post dc* and some have strong marginals on first tergite. At least these large specimens are probably hybrids between *geniculata* and *maculata*.)

- 2 (1) Lower extremity of eyes reaching or exceeding level of vibrissae (fig. 20s). Normally 4 *post dc*. Thorax without vittae; abdominal segments without distinct spots or only with a pair of dots (figs. 21B, D). Third antennal segment not reaching level of vibrissae, dorsal and ventral edges almost parallel.
- 3 (4) First tergite (normally) without marginals (fig. 21B). Lower eye margin slightly exceeding level of vibrissae. Abdomen largely yellow in male with apex and median vitta dark, more or less broadly yellow laterally at base in female. ♂: fig. 21B. 4.3-5.5 mm.

Recorded as parasite of TIPULID larvae (Tipula maxima Poda), *Pegomyia nigratarsis* Zett. (?) and various caterpillars of *Lepidoptera Heterocera, especially*

AGROTIDAE. (Some of the records concern maculata, which has often been considered identical with this species.) England, Scotland (up to Sutherland), generally distributed. m. v-b. vi, b. vii-b. ix, wastes, very common

cristata F.

- 4 (3) First tergite (normally) with a pair of strong marginals (fig. 21c). Lower eye margin just reaching level of vibrissae (fig. 20s). Abdomen of male often yellow at sides, of female wholly grey. ♂: figs. 20s, 21c. 3-6.5 mm.

Recorded as a parasite of larval *Tipula maxima* Poda, *oleracea* L., and *paludosa* Meig. and of caterpillars of AGROTINAE, LARENTIINAE and *Vanessa urticae* L. Life history: Rennie and Sutherland, 1920, Parasitol. 12: 199. England, Wales, Scotland (to Sutherland), Ireland, I.o.Man, Channel Is., generally distributed. b. iv, m. v-b. xi, very common. *geniculata* Degeer.

Tribe VORINI

Genus *Voria* Robineau-Desvoidy, 1830 (*Athrycia* Robineau-Desvoidy, 1830)

In the British species R_5 is open or closed in margin, not petiolate.

- 1 (2) r_1 setulose on dorsal surface. Intermediate abdominal segments (fig. 21d) with only marginals (those of the third segment somewhat removed from margin, sometimes behind them a pair of smaller setae at margin). Parafacialia with only 1 strong proclinate seta (fig. 21g). Eyes bare. Palpi fuscous with orange tips. Black, thorax with 4 undusted vittae, abdomen with broad glossy black hind margins. ♂: figs. 21d, g. 6-8.5 mm. (Sbg. *Voria* s. str. = *Plagia* Meigen.)

Parasite of AGROTIDAE (*Mamestra brassicae* L., *Anarta myrtili* L., *Laphygma exigua* Hb., and especially various *Plusia*), also bred from *Arctia caja* L. (!), *Vanessa atalanta* L. and the sawfly *Diprion pini* L. England, Wales, generally distributed. Moray. Channel Is. m. v-m. x, wastes and marshes

ruralis Fallén.

- 2 (1) r_1 bare. At least third abdominal segment with well-developed median discals (fig. 21e), or eyes densely hairy (fig. 21i).
- 3 (4) Eyes bare. Second and third abdominal segments with discals and marginals (fig. 21e). Parafacialia with at most 2-3 strong proclinate setae (fig. 21h). Palpi fuscous (typical form) or dull orange (ab. *curvinervis* Zetterstedt). Ocellars strong, equal to the stronger (though not the 1-2 strongest) setae of the frons. Marginal bands of abdomen narrower (fig. 21e). ♂: figs. 21e, h, 16c, F. 6-8.5 mm. (Sbg. *Athrycia* Robineau-Desvoidy.)

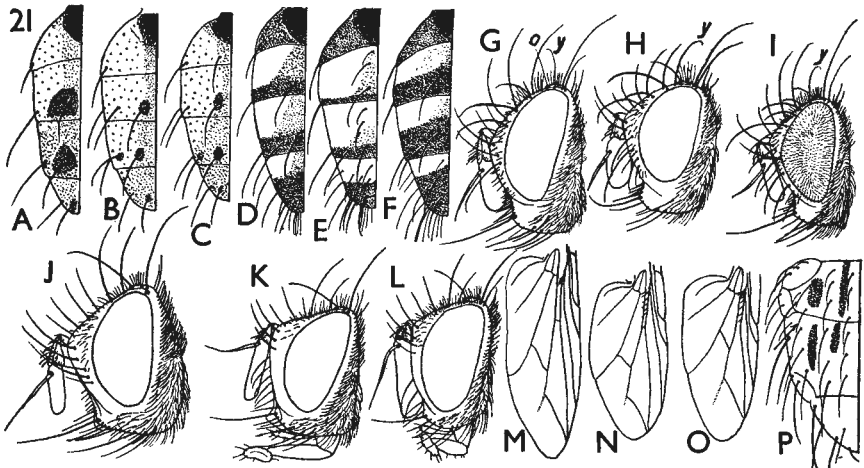


FIG. 21.

- Parasite of numerous AGROTIDAE (Mamestra persicariae L., oleracea L., Tholera popularis F., Orthosia miniosa F., incerta Hufn., gracilis Schiff., stabilis Schiff., Anarta myrtili L., Plusia gamma L., Abrostola tripartita Hufn., Heliothis viriplaca Hufn., and foreign Cucullia and Apopestes), also bred from Eucosma sordidana Hb. (OLETHREUTIDAE), and abroad from a Spilosoma (ARCTIIDAE) and recorded from the sawfly Diprion pini L. Kent to Devon. to Hereford. to Notts., the var. also Ches. and S.W. Ireland. b.v-b.ix, woods, heaths and wastes.* **trepida** Meigen.
- 4 (3) Eyes densely hairy. Second and usually third abdominal segments without distinct discals (fig. 21F). Parafacialia with a row of about 5 strong proclinate setae, continuous with the proclinate setae on parafrontalia (fig. 21r). Palpi orange (typical form) or fuscous (ab. *nigripalpis* Rondani). Black hind margins of the abdominal segments taking up about half the length of the intermediate segments (fig. 21F). ♂: figs. 21F, I. 6.5-8.5 mm. (Sbg. *Cyrtophleba* Rondani = *Plagia* auct. nec Meigen.)
- Parasite of Hadenia serena Schiff., Euclidimera mi Otk., and Ectypa glyphica L. (AGROTIDAE). Kent: Wye Downs, 4 and 6.vi.36, wooded downland* **uricola** Meigen.

Tribe TACHININI (= PHOROCERINI).

KEY TO GENERA.

- 1 (4) Occiput wholly without black setulae behind occipital row (figs. 21J, K). Vibrissa lying above mouth-margin. *prst ia* present (fig. 21P ↑).
- 2 (3) *m-m* about twice as distant from *r-m* as from bend of *m* (fig. 21M), last section of fifth vein about half as long as penultimate, setulae on r_{4+5} not extending halfway to *r-m*. Ascending setulae of facial ridges decumbent, directed downward, extending not or hardly beyond middle. Eyes bare or hairy.
- Tachina** (p. 70).
- 3 (2) *m-m* less distant from *r-m* than from bend, seldom about equidistant from both (fig. 21N), last section of fifth vein almost as long as penultimate; setulae on r_{4+5} extending to about *r-m*. Ascending setae of facial ridges strong, erect, extending to upper third or fourth (fig. 21K); mouth margin distinctly projecting in lateral view. Eyes bare or hairy. Abdomen without discals. Black with whitish dust, apex of scutellum, palpi, basal antennal segments and interfrontalia pale ferruginous; thorax with four black vittae (fig. 21P), abdominal segments glossy black on apical half. ♂: frons almost or fully one-third head-width. ♂: figs. 21K, N, P. 3.7-6 mm.
- Parasite of larvae of Agrotis ypsilon Rott. (AGROTIDAE), Pachythelia opacella H.-S. (? as Stom. filipalpis) and terricolous TENEBRIONIDAE (Blaps, Opatrum, etc.). Suffolk: Felixstowe; Norfolk: Winterton; Yarmouth Denes. m.vii-m.viii, coastal sandhills*

Stomatomyia acuminata Rondani

- 4 (1) Occiput with black setulae on upper part behind occipital row (fig. 21L). Vibrissa at mouth margin; ascending setae of facial ridges strong, erect, extending to above middle.
- 5 (6) Apical scutellars absent (fig. 22A). r_{4+5} ciliate about halfway or fully to *r-m* (fig. 21o). Occiput flattened. Proboscis unusually small (fig. 21L). Eyes almost bare. *prst ia* present (see fig. 21P ↑). Abdomen with (type form) or without (var. *fugax* Rondani) discals. Third antennal segment 4-5 times length of second. Fuscous black, thorax with 4 vittae, abdomen (fig. 22A) with a narrow black median vitta, anterior half of segments pale golden dusted. ♂: frons (fig. 22c) more than a third head-width as in ♀, but without proclinate orbitals. ♂: figs. 21L, o, 22A, c. 3.4-6.5 mm. (= *Bessa* Robineau-Desvoidy?).

Parasite of numerous Heterocera: HYPONOMEUTIDAE (Ethmia decemguttella Hb., various Hyponomeuta), TORTRICIDAE (Sparganothis pilleriana Schiff., Tortrix viridana L., Peronea cristana F., ferrugana Schiff.), OLETHREUTIDAE (abroad in Polychrosis, Laspeyresia, etc.), PHALONIIDAE (Clysiana ambiguaella Hb.), PHYCITIDAE (abroad Salebria), GEOMETRIDAE (Eupithecia assimilata Doubl., Bupalus piniarius L.), LYMANTRIDAE (L. monachus

L., etc.), AGROTIDAE (*Acronicta psi L.*, *Orthosia miniosa F.*), *Sarothripus revayanus Scop.*; and of numerous sawfly larvae (many NEMATINAE and *Gilpinia polytoma Htg.*, DIPRIONIDAE, and abroad *Emphytus*, BLENNOCAMPINAE). *England, generally distributed; the var. only seen from Hants., Worcs., London, Herts. and Suffolk; host records of the type form, as far as checked, concern sawflies, the only var. fugax with host record is from Hyponomeuta. m. v-e. ix, woodlands.* ***Ptychomyia selecta* Meigen.**

- 6 (5) Apical scutellars present (fig. 22B). r_{4+5} with only a few setulae at base. Occiput swollen. Palpi and proboscis developed normally. Eyes densely long-haired.
- 7 (8) Posterior half of each tergite shining black (fig. 22B). Scutellum without discals (but with strong apicals). *prst ia* present. 4 *post dc*; 3 + 3 strong *acr*. Palpi pale orange; apex of scutellum reddish translucent; thorax with 4 narrow undusted vittae; abdominal segments with more than basal half whitish dusted and a narrow black median vitta. ♂: frons more than a quarter head-width. ♀: median part of fifth and sixth ventrites swollen, bare and undusted, exposed and finely transversely rugose-punctate. ♂: figs. 22B, D, E. 8-9.5 mm.

Parasite of larvae of DIPRIONID sawflies (D. pini L., similis Htg., Gilpinia virens Kl., frutetorum F., polytoma Htg.), also recorded from Acronicta rumicis L. (AGROTIDAE). Hants.: New Forest; Surrey: Camberley; Alice Holt, 9.vii (!). Dorset: Parley Heath; Suffolk: Barton Mills. e.vi, b-e.ix, woods ***Diplostichus janithrix* Hartig.**

- 8 (7) Tergites wholly pollinose with shifting reflections (figs. 23K, L). Scutellum as a rule with distinct discals, which are subequal to the apicals. *prst ia* usually absent (present in ♀ *silvestris*). ***Phorocera* (p. 73).**

Genus *Tachina* Meigen, 1803, 1838 (*Larvaevora* Meigen, 1800, *Exorista* Meigen, 1803, *Eutachina* Brauer & Bergenstamm, 1890).

In 1803 Meigen mentioned only species which have later been placed in *Echinomyia* and *Servilia*, in 1824 he listed numerous species in the genus, and in 1838 he divided the genus into smaller ones, the first of which was *Echinomyia* and the fifth *Tachina*, containing among many other species *larvarum*. As the modern "rules" were not then in existence authors generally followed the 1838 arrangement, but Brauer and Bergenstamm (1890) and some modern authors restituted the 1803 meaning. As the main catalogues of Diptera use *Tachina* for *larvarum*, a group of British Dipterists and Entomological Institutions decided in June, 1942 (see *Proc. zool. Soc. Lond.* 114: 390-1, 1944) to follow this procedure, since "the strict application of the Règles" would here require "the transference of names from one genus or species to another." In all British species the abdomen has a blackish more or less undusted median vitta.

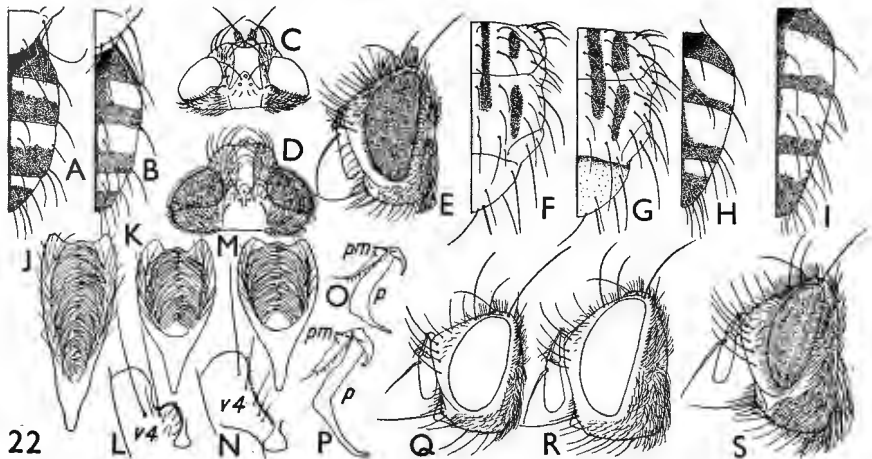


FIG. 22.

- 1 (6) Three *post dc* (fig. 22r). Frontal setae descending to below middle of parafacialia (fig. 22q). Mid tibia with 3-4 *ad* setae. Abdomen black, anterior half or more of intermediate segments and basal third or less of fourth silver-white dusted; second tergite with 4 marginals (figs. 22h, i). ♂: ventral (posterior) surface of superior forceps excavate on greater basal half, the excavation filled by a dense brush of golden hair (figs. 22j, k, m). (Sbg. *Guérinia* Robineau-Desvoidy, 1830.)
- 2 (3) Second tergite without discals (fig. 22h). ♂: superior forceps in ventral (posterior) view more than twice as long as wide (fig. 22j). (5.6-) 7-9.5 mm. (= *pratensis* Robineau-Desvoidy?).
Hants. to Cornwall to Radnor. to Suffolk. b.vi-b.vii, e.vii-m.ix, down-land.....**erucarum** Rondani.
This and the following two species have not been distinguished in host records, which are: *Nymphalis polychloros* L. (NYMPHALIDAE), *Leucoma salicis* L., *Lynantia dispar* L., *monacha* L. (LYMANTRIDAE), *Lasiocampa quercus* L., *Malacosoma neustria* L. (LASIOCAMPIDAE), *Aconitica aceris* L., *Mamestra brassicae* L., *Hadena oleracea* L., *Heliopsis armigera* Hb., *Laphygma exigua* Hb. (AGROTIDAE), *Loxostege sticticalis* L. (PYRALIDAE) and the sawfly larvae *Pristiphora pallidiventris* Fln., *Tenthredo arcuata* Foerst., *viridis* L., *Tenthredopsis nassata* L., *Athalia rosae* L. and abroad a *Cladius*.
- 3 (2) Second tergite (normally) with discals (fig. 22i). ♂: superior forceps in ventral (posterior) view oval (with the apex drawn out), greatest width near middle, up to twice as long as wide (figs. 22k, m). ♀ not distinguishable with certainty.
- 4 (5) ♂: basal half of inner margin of fourth ventrite (fig. 22l) forming a broad lobe which projects both inward and ventrad (often visible without dissection); tapering apical process of penis hardly as long as anterior paramere (fig. 22o). ♂♀: Ascending setulae of facial ridges usually not reaching level of descending frontal setae (fig. 22q); pollinosity more pale golden or silvery, dark hind margin occupying one-half to one-third length of third tergite, more shining. ♂: figs. 22k, l, o, q. 4.5-9 mm. (= *minor* Wainwright).
Kent: Soakham; Hants.: Farley Downs; Gloucs.: Filton; Cambs.: Fleam Dyke; Devil's Ditch; Suffolk: Worlington; Glam.: Gower. m.vi-m.viii**nigricans** Egger.
- 5 (4) ♂: inner margin of fourth ventrite sinuous, basal part not projecting ventrad (fig. 22n); tapering apical process of penis longer than anterior paramere (fig. 22p). ♂♀: ascending setulae on facial ridges usually reaching level of descending frontal setae (fig. 21j); pollinosity more cinereous or greyish, dark hind margin occupying one-third to one-fifth length of third tergite (fig. 22i), more conspicuously brown dusted. ♂: figs. 21j, 22f, i, m, n, p. 7.3-11 mm. (= ? *simulans* Meigen).
England, Wales, generally distributed. Co. Kerry. e.v-b.x, chalk wastes, very common**rustica** Meigen.
- 6 (1) 4 *post dc* (fig. 22g).
- 7 (8) Parafacialia less wide below lowest descending frontals than third antennal segment (fig. 22a). Antennae inserted almost at middle level of eye. Scutellum and abdomen wholly black in ground-colour. Section of *c* in *Sc* not quite half as long as that in *R*₁ (fig. 21m). Eyes virtually bare. (Sbg. *Exoristella* Mesn.). Third antennal segment only slightly longer than second. Second tergite with only a pair of marginals; whitish dust occupying almost the basal two-thirds of third tergite. ♂: superior forceps fig. 23c. ♂: Figs. 21m, 22a, 23c. 5-8 mm. (= *delicatula* Robineau-Desvoidy of Mesnil, not Robineau-Desvoidy?, "*Walkeria*" having discals on second tergite and "*delicatula*" golden parafacialia and whitish yellow calypterae, in *baranoffi* the former pale grey, hardly yellowish, the latter greyish.)
Hants.: New Forest (Lyndhurst; Linwood; Beaulieu); Dorset: White Nothe. b.vi-b.vii, b.ix**baranoffi** Wainwright.
- 8 (7) Parafacialia at least as wide below lowest descending frontals as third antennal segment (figs. 22s, 23g, n). Antennae inserted well above middle level of eye. Scutellum more or less broadly reddish translucent at apex. Section of *c* in *Sc* as a rule at least half as long as that in *R*₁.

- 9 (10) Eyes densely hairy. Ocellars at level of anterior ocellus (fig. 23A). Mid tibia with only 2 *ad* setae. (Sbg. *Podotachina* Brauer and Bergenstamm). Third antennal segment almost twice as long as second. Whittish pollinosity rather dense. ♂: frons about 0.3 times head-width (fig. 23A); ventral (posterior) surface of superior forceps excavate on greater basal half, the excavation filled by a dense brush of golden hair (fig. 23D). ♂: Figs. 22s, 23A, D. 9-14 mm.
- Parasite of Nymphalis* io L. (NYMPHALIDAE), *Hippotion celerio* L., *Smerinthus populi* L., *Sphinx ligustri* L., etc. (SPHINGIDAE), *Lymantria dispar* L., *monacha* L., *Euproctis chrysoorhoea* L., etc. (LYMANTRIIDAE), *Philudoria potatoria* L., etc. (LASIOCAMPIDAE), *Saturnia pavonia* L., etc. (SATURNIIDAE), *Arctia caja* L., etc. (ARCTIIDAE), *Acrionicta aceris* L., *Heliothis armigera* Hb., *Mamestra oleracea* L., *pisal* L. (AGROTIDAE), *Brephos notha* Hb., *Bupalus piniarius* L. (GEOMETRIDAE), *Cossus cossus* L. (COSSIDAE) and abroad genera of HESPERIIDAE, LIMACODIDAE, DREPANIDAE, PSYCHIDAE, AMATHUSIIDAE and BOMBYCIDAE (incl. *Bombyx mori* L.). Almost all British specimens seen were bred from *Saturnia pavonia*. Cornwall to Warwick to Derby. Bute to Ross. m.v-e.vi, e.vii-b.viii, heaths, locally common **sorbillans** Wiedemann.
- 10 (9) Eyes virtually bare, or only with short and rather sparse hairs.²³ Ocellars lying slightly behind level of anterior ocellus (fig. 23B). Mid tibia with 3 *ad* setae. ♂: Ventral surface of superior forceps not excavate, with moderately dense short decumbent dark hairs. (Sbg. *Tachina* s. str.).
- 11 (12) Parafrontalia golden yellow dusted, hairs very fine, much finer than those on anterior upper part of jowls (fig. 23G). Ascending setulae of facial ridges not extending beyond middle and not reaching level of the descending frontals. Pollinosity of thorax cinereous grey to golden grey. ♂: superior forceps fig. 23E. ♂: figs. 16D, G, 22G, 23B, E, G. 6-14 mm.

Parasite of very numerous caterpillars (*Papilio*, *Pieris*, *Nymphalis*, *Aglais*, *Argynnis*, *Melitaea*, *Polygonia*, *Callophrys*, *Macroglossa*, *Deilephila*, *Celerio*, all British LYMANTRIIDAE and most LASIOCAMPIDAE, *Saturnia*, *Spilosoma lubricipeda* L., *Arctia caja* L., numerous AGROTIDAE, *Zygaena*, *Hyponomeuta*, *Loxostege*, *Abraxas*; in addition abroad NOTODONTIDAE, OLETHREUTIDAE, BOMBYCIDAE, incl. *Bombyx mori*) and some sawfly larvae (*Diprion pini* L. and *Acantholyda pinivora* Ensl.). England, Wales, Scot-

²³ But in *T. fasciata segregata* Rondani, which does apparently not occur in Britain, as hairy as in *sorbillans*.

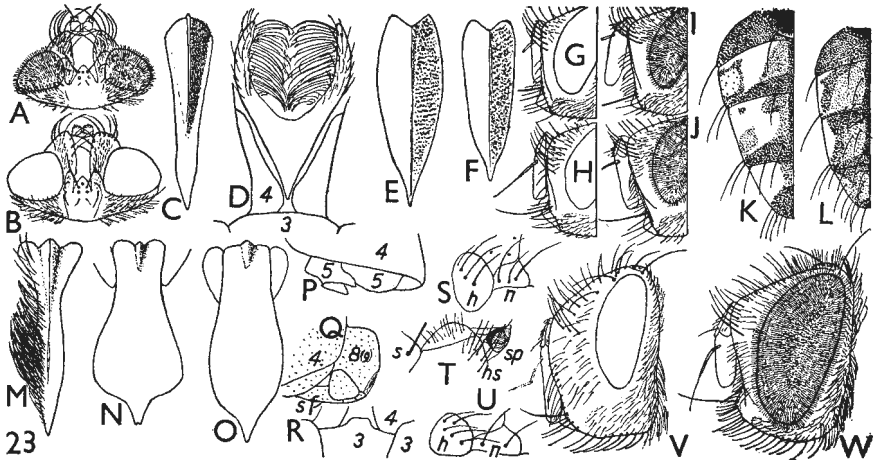


FIG. 23.

- land (to Sutherland), generally distributed. S. Ireland. b.vi, b.vii-b.ix, woods and marshes, very common.....larvarum L.
- 12 (11) Parafrontalia greyish or yellowish white dusted, hairs as long and strong as those on anterior upper part of jowls (fig. 23H). Ascending setulae of facial ridges passing middle and as a rule reaching level of descending frontals. Pollinosity of thorax whitish with hardly any yellowish tinge. ♂: superior forceps (fig. 23F). ♂: figs. 23F, H. 5-13 mm.
- Parasite of *Orgyia antiqua* L., *Lymantria dispar* L. (LYMANTRIIDAE), *Malacosoma castrensis* L., *Eriogaster lanestris* L. (!), *Lasiocampa quercus* L., trifolii Schiff. (!), *Macrothylacia rubi* L., *Phitodorina potatoria* L. (LASIOCAMPIDAE), *Zygaena trifolii* Esp. and *filipendulae* L. Kent to Cornwall, Somerset, Lancs., Ches., Glam. Co. Cork. (bred m.iv), e.v-m.vi, m.vii-b.ix, coastal wastes, very common.....fasciata Fallén.

Genus *Phorocera* Robineau-Desvoidy, 1830.

- 1 (2) 4 *post dc* (see fig. 22G). Setulae of parafrontalia not descending on parafacialia below lowest frontals (fig. 23I). Abdomen without discals (fig. 23K), median marginals of third segment at about fourth fifth, hind margin of their pores anterior to level of front part of the other marginal pores. ♂: hypopygium small, its convex sclerotized part shorter on median line than the membrane surrounding anus; superior forceps fig. 23M. ♀: fifth ventrite not projecting, flat. ♂: figs. 23I, K, M. 7-11.5 mm. (Sbg. *Parasetigena* B. B.). (= *segregata* Rondani of Brauer and Bergenstamm, etc., not Rondani, *media* Rondani, *agilis* Robineau-Desvoidy of Mesnil).
- Important parasite of *Lymantria monacha* L. and *dispar* L., also recorded from *Euproctis phaeorrhoea* Don., *Leucoma salicis* L. (LYMANTRIIDAE), *Pieris brassicae* L., *Polyploca ridens* F. (THYATRIDAE) and the sawfly *Diprion pini* L. Kent: Ham Street; Hants.: New Forest (Lyndhurst; Rhinefield); Hereford. e.v-b.vi, woods, rare.....*silvestris* Robineau-Desvoidy.
- 2 (1) 3 *post dc* (see fig. 22F). Setulae of parafrontalia descending on parafacialia to below lowest frontal setae (fig. 23J). Abdomen with discals (fig. 23L); median marginals of third segment virtually level with the other marginals. ♂: hypopygium large and bulbous, the convex sclerotized part (fig. 23Q) much longer on median line than the membrane surrounding anus; superior forceps (figs. 23N, O) broad and flattened with short decumbent hairs; ventral surface of body and femora with long fine erect somewhat wavy hairs. ♀: fifth ventrite strongly projecting (fig. 23P), shining dark brown, triangularly excised posteriorly, and rounded or laterally compressed anteriorly. (Sbg. *Phorocera* s. str.).
- 3 (4) Basal dorsal excavation of first tergite not much exceeding middle (fig. 23L). Scutellum black, at most somewhat reddish at apex. ♂: third ventrite evenly convex at hind margin; dorsal surface of superior forceps (fig. 23N) with sparse subequal hairs. ♂: figs. 23J, L, N, Q. 4-11 mm. (= *caesifrons* Macquart, = *vernalis* Robineau-Desvoidy.)
- Recorded from *Lymantria monacha* L. (LYMANTRIIDAE), *Orthosia cruda* Schiff. (AGROTIDAE), *Hybernia defoliaria* Ck., *leucophaearia* Schiff., *Operophtera* sp. (GEOMETRIDAE) and a foreign ARCTIID. Kent to Dorset. to Hereford. to Notts. to Norfolk. b.iv-e.vi, woods, very common
- obscura* Fallén.²⁴
- 4 (3) Excavation of first tergite (normally) reaching hind margin (see fig. 23K). Scutellum always more or less reddish on apical half. ♂: third ventrite with a short and broad tongue-like median projection of hind margin, therefore concave on each side (fig. 23R); dorsal surface of superior forceps (fig. 23O) with dense long hairs, which decrease evenly in length from base to apex. ♂: figs. 23O, P, R. 8-13 mm. (= *agilis* Robineau-Desvoidy,

²⁴ At the suggestion of Mr. J. E. Collin and through the courtesy of Prof. C. H. Lindroth I have been able to study the typical pair in Mus. Lund (labelled "*T. obscura* ♂♀ Mus. Fallén"), which is the species studied by Ringdahl under the same name in mus. Stockholm. The male of this pair is herewith selected as the type of *obscura*.

1830, non Mesnil, according to Robineau-Desvoidy, 1863, p. 509, a synonym of *assimilis* Fallén and not of "*Duponchelia*" *silvestris* Robineau-Desvoidy, 1863, p. 531; = *gramma* Meigen).

Parasite of Aporia (PIERIDAE), a foreign NYMPHALID, *Trichiura crataegi* L., *Dasychira pudibunda* L., *Lymantria monacha* L. (LYMANTRIIDAE), Saturnia (SATURNIIDAE), *Cossus* (COSSIDAE), a foreign LASIOCAMPID, ARCTIID, and THAUMETOPOEID, *Amathes c-nigrum* L., *Mamestra brassicae* L., *Cucullia verbasci* L. (AGROTIDAE) and the sawflies *Cimbex femorata* var. *sylvarum* F. and *Diprion pini* L. *Kent to Devon. to Warwks. to Norfolk.* m. iv-e. vi, woods, common.....*assimilis* Fallén.

Subfamily GONIINAE.

KEY TO TRIBES.

- 1 (2) Ocellars strong and reclinate (fig. 23v). Notopleura with a smaller third seta between (and slightly outward of) the normal two setae (fig. 23s). Hind tibia with a *pv* apical seta. Arista elbowed, second segment at least half as long as third (fig. 23v, 24g, h). Frons very broad, appearing waxy and bloated; frontal setae reaching vertex and arranged in 2-3 complete rows. Eyes bare. Antennae long and half-hidden in the excavated face. Apical scutellars straight and diverging, often lying somewhat in front of apex..... GONINI (p. 75).
- 2 (1) Ocellars proclinate (fig. 23w) or absent. Notopleura with two setae (fig. 23v). Hind tibia without a *pv* apical seta (except in *Rhacodineura* and *Brachychaeta*). Arista not elbowed (fig. 23w).
- 3 (4) Beret (the embossed upper strip of the hypopleura between the posterior *stpl* and the posterior thoracic spiracle) hairy in its entire length (fig. 23t). Shoulders normally with 5 (3 outer and 2 inner) setae (fig. 23u). Reclinate orbital setae weakly developed or missing in male (fig. 23w). 2 or 3 *stpl*. Eyes densely hairy. Parafacialia often hairy (fig. 23w)
WINTHEMIINI (p. 76).
- 4 (3) Beret bare at least on greater posterior half. Shoulders with less than 5 setae.
- 5 (6) Occiput without black setulae behind occipital row (fig. 24a). All British species with 4 *post dc* and, if the eyes are distinctly hairy, only 1 + 1 *stpl* (fig. 24k). Either jowls narrower than parafacialia at level of antennal

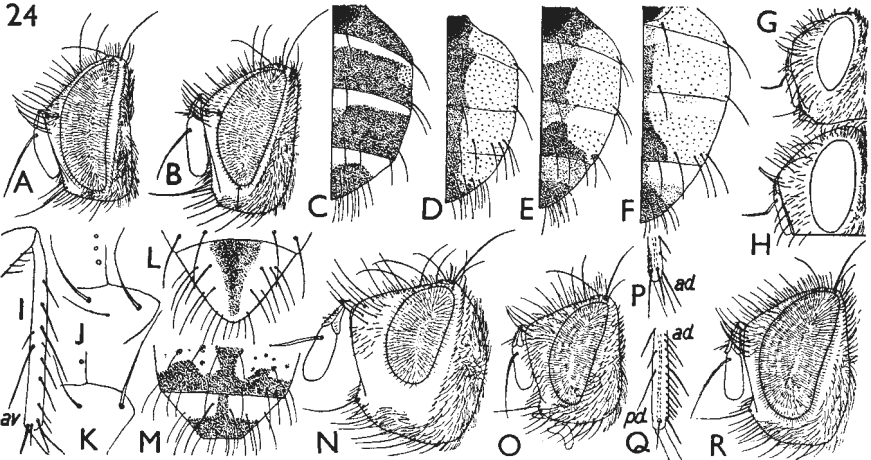


FIG. 24.

- base (fig. 24A $\downarrow \uparrow$) or vertex in both sexes conspicuously more than a third head-width. Hind tibiae with numerous *ad* bristles which form more or less a fringe. CARCELIINI (p. 78).
- 6 (5) Occiput with a row of black setulae behind occipital row (fig. 24B), these are seldom missing or almost missing, in these cases either only 3 *post dc* or 3 or 4 *stpl* present. Jowls at least as wide as parafacialia at level of antennal base (fig. 24B $\downarrow \uparrow$) and not or not much narrower than width of mouth. ERYCIINI (p. 81).

Tribe GONIINI (SALMACIINI).

Genus *Gonia* Meigen, 1803 (*Salmacia* Meigen, 1800).

♂ and ♀ with proclinate orbital setae.

- 1 (4) Abdomen wholly black in ground-colour, at most a small dull reddish suffusion at sides of intermediate segments (fig. 24c). Undusted vittae of thorax rather conspicuous in posterior view.
- 2 (3) Abdomen with only very slight and thin dust, without marked basal bands of white pollinosity. Parafacialia wider at narrowest part than smaller diameter of eye, the setulose hairs much weaker than the setae along inner margin (fig. 23v). Thorax with thin greyish dust. About 14 mm.
Recorded from *Arctia caja* L. *Only one British specimen known. Sussex nr. Plashett, Lewes, 1.iv.71. foersteri* Meigen.
- 3 (2) Abdomen with narrow conspicuous silver-white or golden-white basal bands (fig. 24c). Parafacialia at narrowest part as wide as, or slightly narrower than, eye (fig. 24g), setulae almost or fully as strong as the setae along inner margin. More densely dusted with more conspicuous vittae, dust appearing bronze in dorsal view. ♂: figs. 24c, g. 8-12 mm. (= *fasciata* Meigen nec Wiedemann).
Parasite of *Panolis flammea* Schiff., *Charaeas graminis* L., *Leucania comma* L. (AGROTIDAE). *Kent to Dorset. to Hereford. to Lincs. m.iii-e.v., on long grass on chalk. sricula* Robineau-Desvoidy.
- 4 (1) Abdomen (figs. 24D-F) largely rufous, second segment with not more than about median third black, though another black area may extend from hind margin along sides.
- 5 (6) Parafacialia dull orange, not markedly dusted. Dusted basal bands of abdomen absent or linear (fig. 24D). Hair of occiput rufous, at least below. Smallest width of parafacialia even in female inferior to that of eye (fig. 24H). Dust of thorax bronze on disc, vittae in male indistinct, in female very narrow; pale coloration of abdomen rufous. ♂: figs. 24D, H. 8.5-11 mm.
Parasite of *Agrotis segetum* Schiff. *Kent to Dorset. to Somerset to Suffolk. m.iii-b.vi. divisa* Meigen.
- 6 (5) Parafacialia densely pale golden dusted. Dusted basal bands of abdomen conspicuous, occupying basal quarter or more of posterior segments (figs. 24E, F). Hair of occiput yellowish white. Parafacialia at narrowest part almost or fully as wide as eye. Vittae of thorax rather conspicuous.
- 7 (8) Tibiae piceous black to black. Median vitta of abdomen broad, occupying more than a quarter of width of second segment and broadly passing the median marginals exteriorly on anterior segments (fig. 24E). Dust of thorax somewhat brownish bronze on disc; pale coloration of abdomen more reddish orange. ♂: fig. 24E. 8.5-11.5 mm.
Parasite of *Agrotis segetum* Schiff., *vestigialis* Hufn., *exclamationis* L., *Actebia praecox* L., *Ceramica pisi* L. (AGROTIDAE) and *Pachythelia villosella* Ochs. (PSYCHIDAE). *Kent to Cornwall to Merioneth. to Norfolk, Yorks., Arran, Nairn., Channel Is. m.iv-b.vi. ornata* Meigen.
- 8 (7) Mid and hind tibiae light brown. Median vitta of abdomen narrow, occupying up to about a sixth of the width of the second segment and not or slightly passing median marginals exteriorly on anterior segments (fig. 24F). Dust of thorax greyish white; pale coloration of abdomen more brownish yellow. ♂: fig. 24F. 11-13 mm.

Parasite of Agrotis exclamationis L., segetum Schiff., ypsilon Rott., Actebia praecox L., Heliothis armigera Hb., Ceramica pisi L., Peridroma saucia Hb. (and a foreign Laphygma) (AGROTIDAE). Kent: Deal; Hants.: Farley Downs, etc.; Dorset.: Durlston Head; Swanage Cliffs. m.vii-m.ix, downland.....capitata Degeer.

Tribe WINTHEMINI.

KEY TO GENERA.

- 1 (6) Mid tibia with several strong *ad* setae (fig. 24i). 3 *stpl* (fig. 24j). Fourth tergite not very broad, subconical, up to about twice as wide at base as long (fig. 24L), tip of dorsal surface slightly compressed and therefore in posterior view angulate. (Subtribe SMIDTHINA).
- 2 (3) Arista shorter than third antennal segment, incrassate up to tip (fig. 24n). Width of parafacialia below more than half smallest width of eye; upper half or less setulose. *prst ia* absent. Palpi and apical part of scutellum dull orange red. Face receding below, shorter than frons; head almost as long as high. Hind tibia with 3 strong *d* preapicals (fig. 24p). Fuscous black, thorax with 4 slight undusted vittae; abdomen with paired spots, not or hardly reddish at sides, with discals on at least third and fourth segments. ♀: figs. 24i, j, l, n, p. 6-9 mm.
Hosts unknown. Notts.: Fiskerton, 14.vi.19; Hereford.: Ross-on-Wye, 18.v.31Rhaphiochaeta breviseta Zetterstedt.
- 3 (2) Arista much longer than third antennal segment (fig. 24o), incrassate at base only. Width of parafacialia less than a third or fourth smallest width of eye. *prst ia* present. Hind tibia (fig. 24q) with only 2 *d* (*ad* and *pd*, the *d* being absent or small) preapicals. Parafacialia densely setulose on their entire length (fig. 24o).
- 4 (5) Occiput with 2 irregular rows of black setulae behind occipital row (fig. 24o). 2 *prst acr*; 3 *post dc*. Second to fourth abdominal segments with long discals. Hind tibia with widely spaced *ad* setae of uneven length. Fuscous black with the scutellum largely reddish; the 5 thoracic vittae not very conspicuous; abdomen wholly dark with whitish grey shifting spots; most of the hair on middle of abdomen fully as long as a tergite. ♂: fig. 24o. 5.7-9 mm. (*Megalochaeta* Brauer and Bergenstamm).

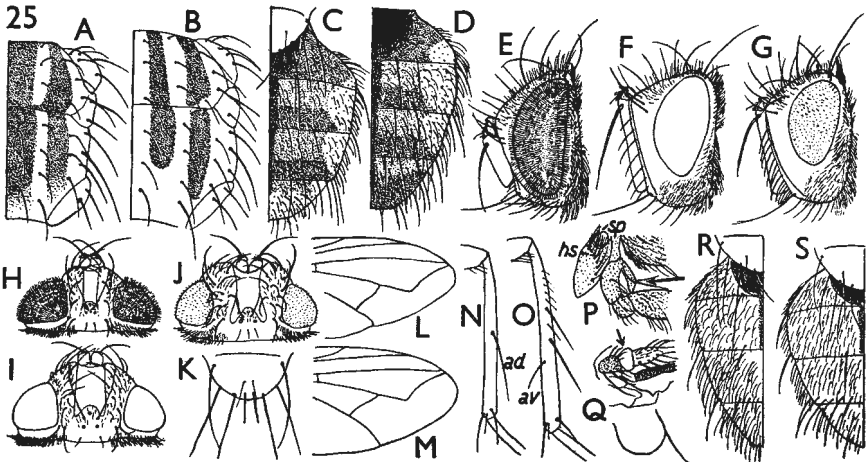


FIG. 25.

- Parasite of Taeniocampa = Orthosia stabilis Schiff. an pulverulenta Esp. = cruda Schiff. (AGROTIDAE) and Oporinia dilutata Schiff. (GEOMETRIDAE). Sussez to Devon. to Lancs. to Norfolk. Perth. b.iv-e.vi, woods, on boles.....Smidtia conspersa Meigen.*
- 5 (4) Occiput with at most odd black setulae behind occipital row. 3 *prst ac*; 4 *post dc*. Intermediate abdominal segments without discals. Hind tibia with a dense fringe of short strong *ad setae* (fig. 24Q). Dark vittae more clearly defined, more complete, the three middle ones not coalescing except on anterior declivity of thorax; abdomen rusty red at sides, shifting spots more disintegrated; hair on middle of abdomen considerably shorter than a tergite. ♂: fig. 24Q. 9-11 mm. (*Chaetolyga* auct., nec Rondani.)
- Parasite of Panolis flammea Schiff., Catocala nupta L., Hadena capsicola Hb. (AGROTIDAE), Saturnia pavonia L. (SATURNIIDAE), Malacosoma neustria L. (LASIOCAMPIDAE), Amphidasis betularia L., a foreign Ortholitha (GEOMETRIDAE) and a Dasychira (LYMANTRIIDAE). Kent to Devon. to Lancs. to Suffolk. e.iv-b.vii.....Nemosturmia amoena Meigen.*
- 6 (1) Mid tibia with only 1 strong *ad seta*, sometimes in addition with 1-2 much weaker ones. 1 + 1 *stpl* (normally, fig. 24K). Fourth tergite trapezoidal, about 2.5-3 times as wide at base as long (fig. 24M), tip truncate and not laterally compressed, therefore in posterior view evenly slightly convex or straight. Arista much longer than third antennal segment, incarsate at base only (fig. 24R). Width of parafacialia less than a third smallest width of eye (fig. 24R). *prst ia* present; 3 + 3 *acr*; 4 *post dc*.
- 7 (8) Parafacialia bare or with only a few isolated black setulae (fig. 24R). Abdomen and scutellum dark, sides of former usually reddish, only apex of palpi somewhat brownish (♂), or palpi orange (most ♀♀). Thorax between the *dc* with a very broad black median vitta (♂) or three narrow poorly separated vittae (♀), another vitta outwards of the *dc* (fig. 25A); second abdominal segment with a somewhat heart-shaped black median spot and like the others with brown-dusted hind margin, which is produced forward on either side of median spot (fig. 24M); intermediate segments with discals. ♂: figs. 24M, R, 25A. 4.5-8 mm. In *floralis* the abdominal spots tend to coalesce, whilst in *maculosa* Meigen (apparently not British, and according to Mons. Mesnil a good species) they are separated, the frons and especially the interfrontalia are wider, the second antennal segment is longer, etc., and the puparium without the tiny spiracular horns near hind margin of fourth segment.
- Parasite of many TORTRICIDAE, PYRALIDAE, OECOPHORIDAE (especially Depressaria), but also HYPONOMEUTIDAE (Ethmia bipunctella, Hyponomeuta spp.), OLETHREUTIDAE (Notocelia uddmanniana L., Cydia pomonella L.), Phalonia roseana Haw. (PHALONIIDAE), Sophronia humerella Schiff. (GELECHIIDAE), Earophila badiata Hb. (GEOMETRIDAE), Mamestra persicariae L., Plusia spp. (AGROTIDAE), Spilosoma lubricipeda L., Callimorpha jacobaeae L., Coscinia striata L. (ARCTIIDAE), Euproctis spp. (LYMANTRIIDAE), Nymphalis io L. (NYMPHALIDAE) and in America even a phytophagous COCCINELLID (Epilachna). Biology: Lucchese, 1940, Boll. Lab. Portici, 5: 49. Kent to Somerset to Glam. to Salop to Yorks. b.v-b.x, gardens, woods, wastes; common.....Nemorilla floralis Fallén.*
- 8 (7) Parafacialia densely setulose on their entire length (fig. 23W). Abdomen (figs. 25C, D) conspicuously red at sides and often apex. Scutellum reddish yellow except for the black basal fifth. Thorax with four vittae (fig. 25B), the paramedian ones well separated and a median one at most indicated; abdomen (figs. 25C, D) with a black median vitta and hind margins, the latter sometimes slightly dilated on either side. Second abdominal segment as a rule without discals, sometimes with irregular small ones

Winthemia (p. 77).

Genus Winthemia Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (2) Apex of abdomen broadly reddish (fig. 25c); hair decumbent, even and short, largely much less than half length of a tergite; intermediate segments

without discals. Occiput without black setulae behind occipital row. ♂: figs. 23w, 25B, c. 6.5-10 mm.

Parasite of numerous NOCTUIDAE (c. 30 species listed, e.g., most British Cucullia), some NYMPHALIDAE (Vanessa io L., urticae L., Argynnis aglaia L.), SPHINGIDAE (Smerinthus ocellata L., populi L., Sphinx ligustri L., Deilephila elpenor L., etc.), LASIOCAMPIDAE (Malacosoma neustria L.), NOTODONTIDAE (Cerura vinula L., etc.), LYMANTRIDAE (Dasychira pudibunda L., Leucoma salicis L., etc.), SATURNIIDAE (Saturnia pavonia L., etc.), GEOMETRIDAE (Ourapteryx sambucaria L., Larentia cervinalis Scop., Biston hirtarius Clk., Hybernia defoliaria Clk., etc.), and abroad ARCTIIDAE, OLETHREUTIDAE, PAPHIIONIDAE and a weevil (Balaninus). England, Wales, Scotland (to Ross), generally distributed, Channel Is. m.v-e.ix., woods and waysides, common.....

- 2 (1) Apex of abdomen fuscous-black (fig. 25D); hair erect, uneven and long, largely half length of a tergite; at least third tergite with some conspicuous irregular median discals. Occiput with a somewhat irregular row of black setulae behind occipital row. ♂: fig. 25D. 7-9 mm.

Hants. to Gloucs. to Worcs. to Cambs. b.v-e.vi, woods, rare. (The specimens mentioned by Parmenter, 1953, p. 30, are quadripustulata F., as I could ascertain thanks to the courtesy of Mr. S. Wakely.)

variegata Meigen.

Tribe CARCELIINI

KEY TO GENERA

- 1 (2) Jowls narrower than parafacialia at level of antennal base and much narrower than mouth (figs. 24A, ♂♂, 25E); vibrissae lying above level of lower eye margin; facial ridges with only a few setulae close to vibrissae; vertex even in female (fig. 25H) at most a third head-width, interfrontalia wider in front than behind. Eyes densely hairy. 1 + 1 *stpl* (see fig. 24K). ♂: ventral surface of third tergite with a spot of dense decumbent black hairs. (Subtribe CARCELIINA) *Carcelia* (p. 79).
- 2 (1) Jowls wider than parafacialia at level of antennal base and wider than mouth (figs. 25F, G); vibrissae lying much below level of lower eye margin; facial ridges with strong setae ascending to well above middle; vertex in both sexes conspicuously more than a third head-width (figs. 25I, J), interfrontalia wider behind than in front. Eyes with sparse short hairs (fig. 25J) or bare (fig. 25I). 2 + 1 *stpl* (see fig. 24J). First tergite with strong marginals. Palpi pale yellow. ♂: ventral surface of third tergite without a spot of dense decumbent black hairs. (Subtribe BAUMHAUERIINA).
- 3 (4) Occiput flattened and somewhat concave (fig. 25F). Apical scutellars decussate (see fig. 25C). Hair (but not setae!) of jowls and mesopleura (and lateral part of thorax in general) pale yellow. Setae on parafrontalia arranged in only two rows, the inclinate frontals and the proclinate and reclinate orbitals, sometimes 1-2 odd much smaller inclinate setae between the rows (fig. 25I). Bend of *m* closer to margin than to *m-m* (fig. 25L). Head and thorax densely golden dusted, the latter with 4 linear vittae; abdomen largely testaceous with a narrow fuscous median vitta. ♂: parafrontalia without proclinate orbital setae (fig. 25I). ♂: figs. 25F, I, L. 9-11 mm.
- Bred from Smerinthus ocellatus L. (!), Sphinx ligustri L. (SPHINGIDAE) and Malacosoma castrensis L. (LASIOCAMPIDAE). Very rare: Wareham, Dorset., 18 and 25.vii.43; Wick, Hants., 28.viii.44; Mytchett, Surr. (bred 15.ii.44); Box Hill, Surr. (27.vii.40, P. Arnaud!); Kingston, Surrey*
- 4 (3) Occiput convex (fig. 25G). Apical scutellars somewhat diverging, erect and more dorsal in position (fig. 25K). Hair of jowls and mesopleura (and thorax in general) black. Setae on parafrontalia forming three rows, the posterior ones in the middle row being bent backward and outward, the bristling therefore appearing untidy and hirsute (figs. 25G, J). Bend of *m* closer to *m-m* than to margin (fig. 25M). Fuscous with largely reddish scutellum; dust whitish grey, thorax with vittae, *prst* part of the outer ones markedly
- Frontina laeta* Meigen.

oblique; abdomen densely dusted with a broad sharply defined spot laterally. ♂♀: parafrota with 2 strong proclinate setae. ♂: figs. 25g, j, k, m. 6-8.5 mm.

Parasite of LYMANTRIIDAE (L. monacha L., dispar L., Euproctis phaeorrhoea Don.), LASIOCAMPIDAE (Malacosoma neustria L.), ARCTIIDAE (A. caja L., villica L., etc.) and AGROTIDAE (Cucullia verbasci L.); also recorded from Phytodecta rufipes Deg. and pallidus L. (CHRYSOMELIDAE). Sussex to Dorset. to Worcs. to Norfolk. S.W. Ireland. b.v-b.vi, m.vii-e.ix, b.xi
Histochoeta marmorata F.

Genus *Carcelia* Robineau-Desvoidy, 1830.

- 1 (4) Mid tibia without an *av* seta beyond middle, and with only 1 *ad* (fig. 25n). Hind coxa without setulae on inner part of apex of posterior surface. Basicoxa (fig. 25q ↑) brown or fuscous. Face in lateral view as long as frons (fig. 25e). Dust greyish yellow, abdomen without marked shifting spots (figs. 25r, s), median vitta present on only second segment (posterior view). Tibiae testaceous, darkened at both ends.

- 2 (3) Fore tibia with 2 *p* setae. Abdomen from apex of scutellum to tip somewhat longer than wide (fig. 25r); hair on dorso-lateral part of third segment more (♂) or slightly less (♀) than half as long as segment, at least third segment with irregular discals, marginals of second segment longer than median length of third. Subapical setae of scutellum at least twice its length. ♂: frons one-quarter to three-tenths head-width. ♂: figs. 25e, n, r. ♀: fig. 25h. 6.5-8.5 mm. (= *obesa* Boheman nec Zetterstedt, teste Ringdahl).

*Parasite of Bupalus piniarius L., Abraxas sylvata Scop. (GEOMETRIDAE), also recorded abroad from Dendrolimus pini L. (LASIOCAMPIDAE). Surrey, Hants. to Hereford. to Lancs., Warwks. (bred iv-e.v), m.vi, m.vii-m.viii, pine and fir woods, locally common.....***rutilla** Rondani.

- 3 (2) Fore tibia with only 1 *p* seta. Abdomen from apex of scutellum to tip somewhat shorter than wide (fig. 25s); hair on dorso-lateral part of third segment somewhat (♂) or much (♀) less than half as long as segment, third segment normally without discals, marginals of second segment in male shorter, in female not longer, than median length of third segment. Subapical scutellars less than twice as long as scutellum. ♂: frons about one-fifth head-width. ♂: fig. 25s. 8-10 mm.

*Parasite of Gonepteryx rhamni L. (PIERIDAE), Sphinx ligustri L., Hyloicus pinastri L., etc. (SPHINGIDAE), Pterostoma palpina Ck., Clostera curtula L., Phalera bucephala L. (NOTODONTIDAE), many LYMANTRIIDAE and ARCTIIDAE (incl. Panaxia), Drepana harpagula Esp. (DREFANIDAE), Endromis versicolora L. (ENDROMIDIDAE), Malacosoma neustria L., castrensis L., etc. (LASIOCAMPIDAE), Acronicta psi L., Cucullia verbasci L., scrophulariae Cap., Abrostola triplasia L., tripartita Hufn., etc. (AGROTIDAE), Abraxas grossulariata L., Bupalus piniarius L. (GEOMETRIDAE) and abroad a Saturnia and Thaumetopoea. Devon: Lynton, 29.vii.95 (subapical scutellars as in rutilla).....***excisa** Fallén.

- 4 (1) Mid tibia with an *av* seta beyond middle (fig. 25o). Hind coxa with some black setulae on inner part of apex of posterior surface (fig. 25p ↑). Abdomen with a more or less distinct complete median vitta (figs. 26b-e).

- 5 (6) Apical scutellars fine (fig. 26b) and much shorter than lateral seta (between basal and subapical). Face longer in profile than frons (fig. 26a). Mid tibia with only one *ad* seta (sometimes a small one just basad of it). Basicoxa (fig. 25q ↑) fuscous. Intermediate abdominal segments with discals (fig. 26b). Fuscous black with orange palpi, scutellum and tibiae, lateral surface of second abdominal segment reddish at base; dust thin and grey, denser and white at sides. ♀: palpi (fig. 26a) and apical segments of tarsi broadened, fifth tarsal segment also lengthened. ♂: fig. 26b. ♀: fig. 26a. 5.5-8 mm. (Sbg. *Euryclaea* Robineau-Desvoidy; = *phalaenaria* auct., nec Rondani.)

*Parasite of Arctia caja L. Kent to Cornwall to Gloucs. to Notts. to Norfolk. e.iv-e.vi, woodlands, rare.....***tibialis** Robineau-Desvoidy.

- 6 (5) Apical scutellars fully as long as lateral seta (figs. 26c-e). Face distinctly shorter in profile than frons (fig. 24A). If the mid tibia has only one distinct *ad*, basicosta (fig. 25Q↑) pale and abdomen without discals. Palpi of female not wider than those of male, but in *gnava* dilated in both sexes. Parafrontalia densely whitish dusted, especially on anterior two-thirds. (*Carcelia* s. str.)
- 7 (8) Mid tibia with only 1 *ad* seta. Basicosta pale testaceous. Abdomen without discals (fig. 26c), very evenly haired. Fuscous, palpi orange, tibiae and scutellum pale testaceous, this coloration extending forward along postalar callosity and around the *prsc*. ♂: frons less than a quarter head-width (fig. 26f); intermediate abdominal segments testaceous on outer half; inferior forceps as long as superior, evenly narrowed towards apex, distinctly though slightly curved away from body. ♀: fore tarsi not dilated. ♂: figs. 26c, f. 7-11, usually 7-9 mm.

Parasite of Dasychira pudibunda L., *Orgyia gonostigma* F. (LYMANTRIIDAE) and *Malacosoma neustria* L. (LASIOCAMPIDAE). *Hants. to Cornwall to Pembroke to Worcs. to Oxon.* b.vi-b.vii, b.viii, *woods and wastes, uncommon* **bombylans** Robineau-Desvoidy.

- 8 (7) Mid tibia with 2-3 *ad* setae. Basicosta fuscous. Pale coloration of scutellum not extended to *prsc*. ♂: only anterior two tergites pale at sides (figs. 26d, e).
- 9 (10) Arista cylindrical in basal half, whence it tapers suddenly (fig. 26h). Interfrontalia in anterior half virtually as wide or wider than a parafrontale (fig. 26g). Palpi markedly clubbed. Descending frontal setae not exceeding apical level of second antennal segment. Abdomen evenly haired on disc, without discals, rather densely whitish dusted with a narrow dark median vitta and hind margins (fig. 26d). ♂: frons a quarter head-width (fig. 26g); inferior forceps slender, slightly shorter than superior. ♀: fore tarsi not at all dilated. ♂: figs. 26d, g, h. 8-10 mm. (= *excavata* Zetterstedt; Meigen's male specimen labelled "*gnava*" in the Paris Museum—see Mesnil, 1944, p. 47—is herewith selected as the type of *gnava*.)

Parasite of many LYMANTRIIDAE, some ARCTIIDAE (A. caja L., etc., *Phragmatobia fuliginosa* L.), LASIOCAMPIDAE (*Malacosoma neustria* L., *castrensis* L., etc.), ACRONICTA psi L. (AGROTIDAE), *Polyplaca ridens* F. (THYATIRIDAE), *Endromis versicolora* L. (ENDROMIDAE), and *Eupithecia intricata* Zett. (GEOMETRIDAE). *Hants. to Cornwall to Gloucs. to Lancs. to Notts. Co. Mayo.* b.iv-b.vii, m.viii-e.viii, *woods, scarce* **gnava** Meigen.

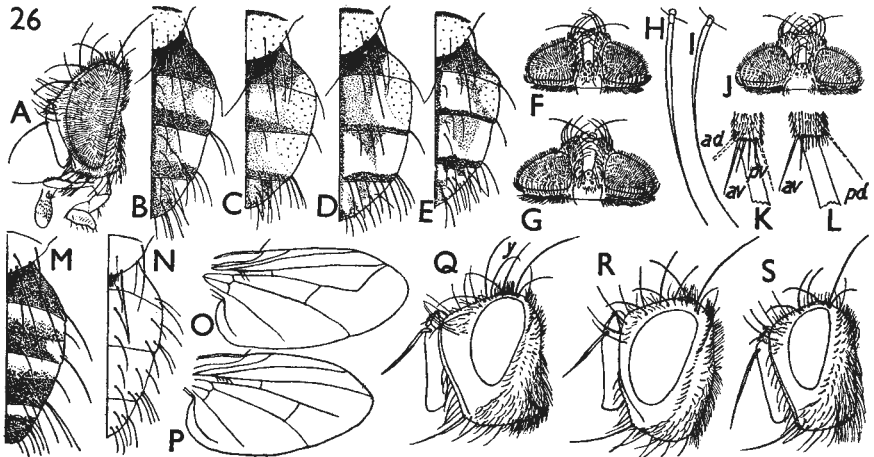


FIG. 26.

- 10 (9) Arista gradually tapering from about basal third (fig. 26r). Interfrontalia narrower than a parafrontale (fig. 26j). Palpi only very slightly dilated. Descending frontal setae reaching or exceeding level of base of arista. Abdomen with much coarser hair near middle, among which some irregular median discals are distinct (fig. 26E), disc with conspicuous shifting dark reflections. ♂: frons almost a quarter head-width (fig. 26j); inferior forceps stout, at least a quarter shorter than superior forceps. ♀: fore tarsi very slightly and evenly broader than those of male. ♂: figs. 24A, 26E, I, J. 6.5-9 mm. (= *comata* Rondani = *gnava* Meigen pars).

Parasite of many ARCTIIDAE and LYMANTRIIDAE, some LASIOCAMPIDAE (Malacosoma neustria L., castrensis L., etc., Macrothylacia rubi L., Philudoria potatoria L.), AGROTIDAE (Apamea secalis L., Agrochola lychnidis Schiff., etc.), Phalera bucephala L. (NOTODONTIDAE), the sawflies Cimbex femorata L. and Acantholyda pinivora Ensl., and abroad a TORTRICID. Kent to Cornwall to Lancs. to Suffolk. e.iv-b.ix, woods and wastes, common lucorum Meigen.

Tribe ERYCIINI.

KEY TO SUBTRIBES.

- 1 (2) Hind tibia with an apical *pv* seta and three strong *d* preapicals (*ad*, *d* and *pd*); if the *pv* apical seta is indistinct (fig. 26k), r_{4+5} ending closer to r_{2+3} than to wing tip (fig. 26o). Mid tibia with at least two strong *ad* setae. Sector of *m* between *m-m* and bend (figs. 26o, p) almost or fully as long as apical cross-vein or, if the latter missing, as distance between tips of *m* and r_{4+5} . Setae on facial ridges ascending almost or fully to middle (figs. 26q, r). Eyes bare. Costal spine strong. Vertex (♂♀) much more than a third head-width.....BRACHYCHAETINA (p. 81).
- 2 (1) Hind tibia without a *pv* apical seta (fig. 26l), seldom with three *d* preapicals, in this case r_{4+5} ending much closer to wing tip than to r_{2+3} . Other characters not all present at the same time.....ERYCIINA (p. 82).

Subtribe BRACHYCHAETINA.

KEY TO GENERA AND SPECIES.

- 1 (2) Tip of r_{4+5} closer to that of r_{2+3} than to that of wing (fig. 26o); apical cross-vein present. Arista incrassate in basal three-fourths, even apical part not very thin (fig. 26q). Fuscous-black with rather thin dust on thorax and conspicuous yellowish-grey dusted basal bands on abdomen. Apical scutellars decussate and directed more upward and forward than backward (fig. 26m), in lateral view describing a dorsally concave curve. Parafrontalia with a strong praevertical (fig. 26q, y); bent outward and backward). ♂: figs. 26k, m, o, q. 4-6.5 mm.

Parasite of Notodonta dromedarius L. (NOTODONTIDAE). Hants. to Devon. to Merioneth. to Suffolk; Lincs. Inverness. m.iii-b.v, woods, rare

Brachychaeta strigata Meigen.

- 2 (1) Tip of r_{4+5} closer to that of wing than to that of r_{2+3} ; apical cross-vein absent (common form: ab. *antiqua* Meigen) to complete (type form). Arista incrassate on about basal half, apical part fine and thin (fig. 26r). Fuscous-black with dense and uniform cinereous dust, inner vitta linear, outer one consisting of two small spots; abdomen (fig. 26n) without dark spots. Legs pale testaceous. Apical scutellars diverging and directed backward, slightly bent downward. Without a praevertical seta. ♂: figs. 26n, p, r. 5-7.5 mm.

Parasite of Forficula auricularia L., etc. (DERMAPTERA), Lymantria dispar L. (LYMANTRIIDAE) and Orthosia miniosa F. (AGROTIDAE). Kent to Dorset. to Somerset to Ches. to Notts. Moray. Orkneys. e.iv, e.v-e.x, woods, gardens, rather common.....Rhacodineura pallipes Fallén.

Subtribe ERYCIINA.

KEY TO GENERA.

- 1 (18) Eyes virtually bare. Ocellars strong (fig. 26s). Two (or three) reclinate upper frontals (sometimes not so distinct in *Hebia*, which has pale legs).²⁵
- 2 (13) Mid tibia with only one strong *ad* seta (see fig. 25N), sometimes with a very small one basad to it. Section of *m* between *m-m* and bend as a rule almost or fully as long as apical cross-vein, bend more broadly obtuse; *m* ending very close to wing tip (see fig. 29A).
- 3 (8) Setulae on facial ridges ascending at least almost to middle (figs. 26s, 28r, j); if not reaching it, only 3 *post dc* present and abdomen wholly undusted glossy black. Discals of intermediate abdominal segments well developed (fig. 28r). ♂: frons almost or fully a third head-width.
- 4 (5) Legs wholly pale testaceous with infuscate tarsi; palpi whitish yellow. Prosternum bare (see fig. 2A). Parafacialia setulose on about upper third (fig. 26s); jowls more than half height of eye. Arista incrassate in more than basal half. Hind tibia with 3 *d* preapicals, the *pd* one smaller. 4 *post dc*. Densely grey dusted, thorax with four, sometimes indistinct, vittae; abdomen evenly dusted, brown-dusted hind margins of one-third to one-fifth length of segments, interrupted by pale dust between the marginals. Third antennal segment black in male, bright yellow in female. ♂: fig. 26s. 4·7-6·7 mm.

Bred from *Orthosia miniosa* Schiff. (AGROTIDAE), *Colotois pennaria* L. and *abroad* a *Cidaria* (GEOMETRIDAE). *Hants. to Devon. to Salop to Suffolk.* e. iv-m. vi

- 5 (4) Legs fuscous black like the whole body, antennae, etc. Prosternum setulose (see fig. 2B). Parafacialia bare below descending frontal setae (figs. 28r, j); jowls about a third height of eye. Arista incrassate on less than basal half. Hind tibia with 2 *d* preapicals. Dark flies.
- 6 (7) *R*₅ open. Palpi fuscous black. **Elodia** (p. 86).
- 7 (6) *R*₅ stalked (fig. 17o). Palpi light brown, at least on basal half. Apical scutellars replaced by a pair of preapical setae, which are stubby, directed upward and placed above apex (fig. 18c). Abdomen without distinct whitish dust; dorsal excavation reaching hind margin of first tergite, the latter without (or with very weak) marginals. ♂: proclinate orbital setae absent. ♂: figs. 17o, 18a, c, e. 2·8-4·5 mm.

Parasite of *Sparganothis pilleriana* Schiff. (TORTRICIDAE), *doubtfully recorded from* *Lymantria monacha* L. *Suffolk: Tuddenham; Barton Mills; Aldeburgh. Kent: Dungeness. Oxon. m. v-e. v, b. viii-e. ix, marshes, locally in numbers* **Erynnia nitida** Robineau-Desvoidy.

- 8 (3) Setulae on facial ridges not ascending beyond lower third or so (fig. 27A). 4 *post dc*. Abdominal segments distinctly pale dusted at bases (figs. 27H, I). Parafacialia bare below descending frontal setae (fig. 27A).
- 9 (10) Basal antennal segments (and in female inner surface of third) and palpi pale orange. Abdomen (fig. 27H) glossy with narrow complete grey-dusted basal bands; second tergite without discals, first without distinct marginals, third with discals and a marginal row. Fuscous black, scutellum broadly reddish; thorax thinly dusted with four incomplete vittae. ♂: parafacialia with 2 proclinate orbitals; frons more than a third head-width (see fig. 27B). ♀: figs. 27A, B, H. 4·5-6 mm. (*Erythrocerca* auct. nec Robineau-Desvoidy, 1849; *Eurysthaea* Robineau-Desvoidy, 1863, nec *Eurysthaea* Thomson, 1860; *scutellaris* Robineau-Desvoidy, 1849, = *yponomeutae* Rondani, 1861.)

Parasite of most *Hyponomeuta*, *Scythropia crataegella* L. ? (HYPONOMEUTIDAE), *Tortrix viridana* L., *Sparganothis pilleriana* Schiff. (TORTRICIDAE), *Hypena rostralis* L. (AGROTIDAE) and a *foreign* *Abraxas* (GEOMETRIDAE). *Kent: Bexley*, 9. vi. 03

Discochaeta evonymellae Ratzeburg.

²⁵ Without a reclinate seta; height of jowls several times as long as antennae, which are very small: see *Trica* (DEXIINAE), which has no *pv* apical seta on the hind tibia and sometimes a setula on the prosternum, and which might therefore be traced to the present group.

- 10 (9) Antennae wholly fuscous-black. Abdomen with a narrow black median vitta which interrupts the pale-dusted basal bands (fig. 27I); first tergite with, sometimes weak, marginals. ♂: parafrontalia without proclinate orbitals.
- 11 (12) 6-9 mm. Palpi pale orange. Abdomen reddish at sides; intermediate tergites with well-developed discals. Hind tibia with a regular comb-like row of *ad* setae, one seta stronger. Prosternum bare (see fig. 2A). ♂: frons a quarter head-width.

Parasite of Cossus cossus L. Hants.: New Forest, 1.vii.97

**Xylotachina ligniperdae* Brauer and Bergenstamm.

- 12 (11) 3.5-6.5 mm. Palpi fuscous-black, sometimes the extreme tip orange. Abdomen (fig. 27I) wholly fuscous black, posterior three segments grey dusted on basal half, with brown dusted hind margins, which are extended forward in posterior view on either side; intermediate segments with irregular, often indistinct discals. Hind tibia with numerous but rather widely spaced *ad* setae and setulae of irregular size. Prosternum setulose. ♂: frons almost a third to two-fifths head-width (fig. 27C). ♂: figs. 27C, I.

Parasite of Thecla w-album Knoch (LYCAENIDAE), Clostera anachoreta Schiff. (NOTODONTIDAE), Drepana (DREPANIDAE), Bena prasinana L., Mamestra pisi L., Orthosia gracilis Schiff. (AGROTIDAE), Anticollix sparsata Fr., Abraxas sylvata Scop., abroad an Eupithecia (GEOMETRIDAE) and Hyponomeuta. Hants.: New Forest, 20.vii.15; Dorset: Wool, 18.vii.44; Hereford.: Westhild, 25.v.99; Worcs.: Wyre Forest, 14.vii.01, 30.v.37; Suffolk: Timworth; Sussex: Laughton, 5.vi.88; Cambs.: Chippenham, 5.ix.34 (J. E. Collin!).....

- 13 (2) Mid tibia with at least two strong *ad* setae, the second normally well over half as long as the strongest (fig. 27D). Section of *m* between *m-m* and bend distinctly shorter than apical cross-vein (fig. 27E); *m* ending farther from wing-tip (by more than length of *r-m*). Hind tibia with only two strong *d* preapicals. First tergite with strong marginals.²⁶ Basicosta (see fig. 25Q ↑) fuscous (except in *Erycia cinerea*). Costal spine small or indistinct.

- 14 (17) Base of r_{4+5} with 2 or more setulae (see fig. 29B). Palpi reddish yellow at least at apex.²⁷ Second tergite without or (*E. ferruginea*) with irregular discals, in the latter case tibiae testaceous. Apical scutellars directed backward, convex or virtually straight in lateral view (fig. 27F).

- 15 (16) Arista tapering from basal third or sixth (fig. 28C). Scutellum reddish at least along apical and most of lateral margins. Palpi wholly reddish yellow. ♂: without proclinate orbital setae (fig. 28c)..... **Erycia** (p. 86).

- 16 (15) Arista of even width almost or fully to middle (fig. 28D). Lower anterior *stpl* well below the others, separated from a line imagined through the centres of their pores by 2-3 times the width of its own pore (fig. 27o). Palpi infuscated with reddish-yellow apex. ♂: with 1-2 proclinate orbital setae (fig. 28D). (Probably not British.)..... **Masicera** (p. 87).

- 17 (14) Base of r_{4+5} with only 1 setula (fig. 27E). Palpi fuscous black. Second and third tergites with strong and regular discals (fig. 27K); with grey-dusted basal bands and a black median vitta. Apical scutellars in lateral view concave with the apices curved upward and almost forward (fig. 27G); subapical scutellars less widely separated from each other than from basal scutellars; scutellum black. ♂: ventral part of third tergite with a spot of dense short decumbent black hairs..... **Paraphrocera** (p. 87).

- 18 (1) Eyes densely hairy (figs. 28A, B, 29P-R), seldom (*Phorcida*) only thinly but quite conspicuously hairy, in this case ocellars missing (fig. 27L).

²⁶ First tergite with weak or indistinct marginals. Ocellars distinctly anterior to level of front margin of anterior ocellus. Parafacialia bare below descending frontals. Face somewhat shorter in profile than frons. Hind tibia with a dense row of equal *ad* setulae. ♂: ventral surface of third tergite with a large (paired) spot of dense closely adpressed black hairs ("Sturmia spot"). *Sturmia (Zygobothria) atropivora* Robineau-Desvoidy. Only British locality: Channel Is.

²⁷ Palpi fuscous. Apical scutellars curved upward, describing a dorsally concave curve in lateral view. Ocellars long but rather fine. Setae on facial ridges strong, ascending almost or fully to level of descending frontals. Arista tapering from basal third or fourth: *Prosopaea nigricans* Eggers. Only British locality: Channel Is.

- 19 (30) Two (or three) reclinate upper frontals (figs. 27L-N). Setulae on facial ridges not exceeding middle, except in some *Zenillia*; in these cases the subapical scutellars less widely separated from each other than from sub-basal scutellars.
- 20 (21) Ocellars absent (fig. 27L). Second and third tergites without discals (fig. 27Q). Base of r_{4+5} with only one setula (see fig. 27E). Inner margin of lower calyptra somewhat sinuous, slightly concave at the basal marginal setae of scutellum (fig. 27Q). Palpi brownish orange with paler tip; base of third antennal segment translucent orange; scutellum largely pale ferruginous; rather densely pale grey dusted, abdomen with linear brown median vitta and narrow glossy fuscous-black hind margins. ♂: ventral surface of third tergite and basal half of fourth glossy with fine decumbent hairs. ♀: figs. 27L, P, Q. 8-10 mm. (*Drino volucris* Robineau-Desvoidy, 1830, of Mesnil, nec Robineau-Desvoidy?, since the latter describes *m* with an appendage; Mesnil places *lota* in Sturmimi, using the formation of the calyptra as their main character (see *Pales*, p. 85).)

Parasite of various AGROTIDAE (*Acronicta alni* L., *tridens* Schiff., *psi* L., *Amathes ashworthi* Doubl., *Orthosia stabilis* Schiff.), SPHINGIDAE (*Hyloicus pinastri* L., *Deilephila elpenor* L.), and of *Malacosoma neustria* L. (LASIO-CAMPIDAE) and *Pieris brassicae* L. (PIERIDAE). *Very rare: New Forest, Hants.; Brockenhurst, Hants.; Soakham Down, Kent; Weybridge, Surrey; Coombe Dingle, Gloucs.; Loxley Wood, Walton Moor, and Edington, Somerset; Hereford.; Dumbarton. to Inverness. Co. Mayo. b.vi-m.vii, b.viii*

Phorcida lota Meigen.

- 21 (20) Ocellars well-developed (figs. 27M, N, etc.). Second and third tergites (fig. 27R) with distinct though sometimes irregular discals (except in *Zenillia tritaeniata* and *confinis* and *Hemimacquartia*). Base of r_{4+5} with 2 or more setulae (except in *Z. tritaeniata*). ♂: without a spot of dense decumbent hair on third tergite.
- 22 (23) Parafacialia with a row of setulose black hairs extending over their whole length and irregularly doubled above (fig. 27M). Subapical scutellars more widely separated from each other than from basal scutellars (fig. 27R). Palpi, antennae, legs, basicosta fuscous black. Dorsal surface glossy fuscous black with some dust; thorax with four faint vittae, abdomen rather thickly dusted at base of second to fourth segments, with an undusted median vitta. Frons three-tenths (♂) to fully one-third (♀) head-width. ♂: figs. 27M, N. 7.5-9 mm.

Parasite of Pieris rapae L. and *Saturnia pavonia* L. *England and Wales, generally distributed. Moray, S. Ireland. Channel Is. b.v-b.x, waysides, very common.....Epicamponera succincta* Meigen.

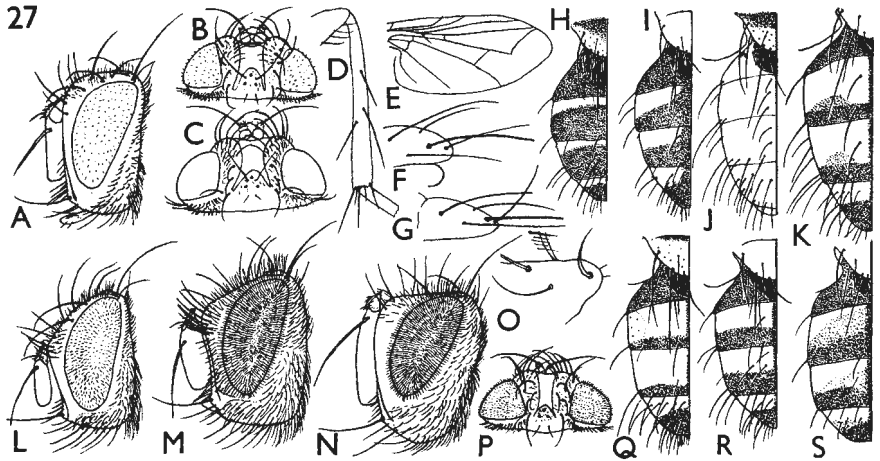


FIG. 27.

- 23 (22) Parafacialia bare or with only some setulose hairs just below the descending frontal setae (fig. 27N).
- 24 (27) Jowls nearly half as high as eye (figs. 2D, 27N). Palpi and basicosta rufous. Subapical scutellars less widely separated from each other than from basal scutellars. Abdomen with marginals on first segment. Calyptrae and base of wings markedly ochraceous.
- 25 (26) Legs, interfrontalia and scutellum (except sometimes apex) fuscous in ground-colour, tibiae light brown. Mid tibia with only one strong *ad* seta. 3 *post dc*. Rather densely whitish to cinereous grey dusted, somewhat variable, thorax with four conspicuous vittae, in male further with a slight brown-dusted median vitta, which extends forward from the *prsc*. Basal two-thirds to four-fifths of abdominal segments pale dusted, hind margins fuscous with brown dust. ♂♀: normally with a single proclinate orbital (often bent more outward than forward); frons more than a third head-width. ♂: fig. 27N. 4–6mm. (*Cyzenis* Robineau-Desvoidy?).
Parasite of *Operophthera brumata* L., *Triphosa dubitata* L., *Eupithecia pimpinellata* Hb. (GEOMETRIDAE). *England, Scotland (to Sutherland), generally distributed.* m.iv–m.vi, woods, common. **Monochaeta albicans** Fallén.
- 26 (25) Legs, interfrontalia and scutellum rufous. Mid tibia with two or more strong *ad* setae. 4 *post dc*. Densely golden grey dusted, especially abdomen of male strikingly golden grey, abdomen (♂♀) without dark hind margins or dark spots (except sometimes slight shifting ones). Wings conspicuously yellowish at base. ♀: fig. 2D. 5.5–10 mm.
Parasite of *Lymantria monacha* L. (LYMANTRIIDAE), *Orthosia mimiosa* F., *stabilis* Schiff., *Cosmia trapezina* L. (AGROTIDAE), *Phigalia pediaia* F. (GEOMETRIDAE). *S. and M. England, generally distributed (to Ches. and Notts.).* b.iv–e.vi, woods, fairly common. **Phryno vetula** Meigen
- 27 (24) Jowls up to about a third height of eye (fig. 24B); parafacialia at narrowest part conspicuously narrower than third antennal segment. Legs, basicosta, and interfrontalia fuscous.
- 28 (29) Apical scutellars absent or fine (fig. 27s), much smaller than the lateral, and much less than half as long as the subapical, scutellars. Antennae inserted not much below level of upper eye margins; third segment long and broad, its base strongly projecting in profile beyond outline of second. Setulae on facial ridges fine and small, not approaching middle. 4 *post dc*, 3 *stpl*. Abdomen without discals (in the specimen in coll. Wainwright with very small irregular ones), first segment without marginals (fig. 27s). Fuscous black with orange palpi, thinly whitish dusted, thoracic vittae fused into a broadly transverse spot behind suture. ♂: without proclinate orbitals; frons as in ♀ almost a third head-width. ♀: fig. 27s. 6–9 mm.
Hosts unknown. Inverness.: Aviemore, 26.v.34; nr. Grantown on Spey, 19.vi.43. **Hemimacquartia paradoxa** Brauer and Bergenstamm.
- 29 (30) Apical scutellars at least subequal to the lateral (fig. 28E), and (except in *pullata*) conspicuously more than half as long as the subapical, scutellars. Antennae inserted considerably below level of upper eye margins (fig. 24B). Setae on facial ridges sometimes ascending beyond middle. 4 *post dc*; 3 *prst acr*; 3–4 *stpl*. Ocellars present (fig. 29F–R) . . **Zenillia**. (p. 88).
- 30 (19) Only 1 well-developed reclinate upper frontal seta²⁸, or if rarely 2, the setae on facial ridges extending over lower two-thirds (figs. 28A, B); parafacialia bare on more than lower half. Basicosta and femora fuscous; costal spine small or indistinct; base of r_{4+5} with several setulae. Subapical scutellars more widely separated from each other than from basal scutellars (fig. 28G); apical scutellars in lateral view dorsally convex (see fig. 27F). ♂: Ventral part of third tergite without a spot of dense fine decumbent hairs.
- 31 (32) Setulae on facial ridges small and decumbent, not or hardly exceeding lower third (fig. 28A). Second to fourth abdominal segments in posterior view with a dark median vitta (fig. 28G). Legs wholly fuscous brown to black.

²⁸ *Pales* and *Phorcida* are placed in Sturmiini by Mesnil, 1949, mainly because of the sinuate inner margin of the lower calyptra, but in British *Pales* this margin is often evenly rounded. It appears therefore more conducive to the safe identification of British species to follow Mesnil's 1939 paper in leaving these three species outside the Sturmiini, which tribe is then not represented in this country.

- Thorax with a linear dark median vitta (thus with 5 vittae) in front of suture, or the palpi with reddish-yellow apex..... **Eumea**. (p. 94).
- 32 (31) Setae on facial ridges quite strong and suberect, extending over lower two-thirds (fig. 28B). Abdominal segments in posterior view without a dark median vitta (figs. 31P, Q), but the whitish dust often somewhat more conspicuous and extended on median line. Thorax without a dark undusted median vitta, and palpi fuscous..... **Pales** (p. 95).

Genus **Elodia** Robineau-Desvoidy, 1863 (*Arrhinomyia* Brauer and Bergenstamm pars).

KEY TO SPECIES.

- 1 (2) Wholly black with thin whitish dust only at shoulders and on lower half of head. 3 *post dc.* Occiput with several rows of black setulae behind occipital row. Setulae on facial ridges not ascending to beyond middle (fig. 28I). Apical scutellars fine (fig. 28o), strongly upcurved, in lateral view forming a dorsally concave curve. ♂: figs. 28i, o. 3.5-5.5 mm. (= *morio* Fln. ?).

Parasite of *Cydia pomonella* L., *servillana* Dup., *Eucosma sordidana* Hb., a foreign Polychrosis (OLETHREUTIDAE), *Tortrix viridana* L., *Peronea maccana* Tr., *hastiana* L., *Cacoecia rosana* L. (TORTRICIDAE), *Depressaria ocellana* F. (OECOPHORIDAE *Audcent!*), *Anacamptis populella* Ck. (GELECHIDAE, *Audcent!*), *Tinea lapella* Hb. (TINEIDAE) and a foreign HYPONOMEUTID. *Sussex to Hereford. to Warwks. to Middx., Lancs. Stirling. to Inverness.* b.v-e.vi, e.vii-e.ix, rare..... **tragica** Meigen.

- 2 (1) Black with conspicuous whitish dust even on parafrontalia and thorax, the latter with vittae; abdomen (fig. 28R) with a black median vitta. 4 *post dc.* Occiput with only one row of black setulae behind occipital row. Setulae on facial ridges reaching or exceeding middle (fig. 28J). Apical scutellars replaced by a pair of straight, strongish, subparallel preapicals. ♂: figs. 28j, r. 5.5-6.5 mm. (= *cloacellae* Kramer).

Parasite of *Tinea cloacella* Haw. and *Scardia boleti* F. (TINEIDAE), in fungi on birch, poplar, beech, also recorded from *Hyponomeuta padella* L. *Hants.: New Forest, 24.vi.21; Berks.: Windsor Forest, 4.i.34; Gloucs.: Coombe Dingle, 30.v.48. Surrey: Frimley, 5.vii.53 (S. Wakely!), woods, rare* **convexifrons** Zetterstedt.

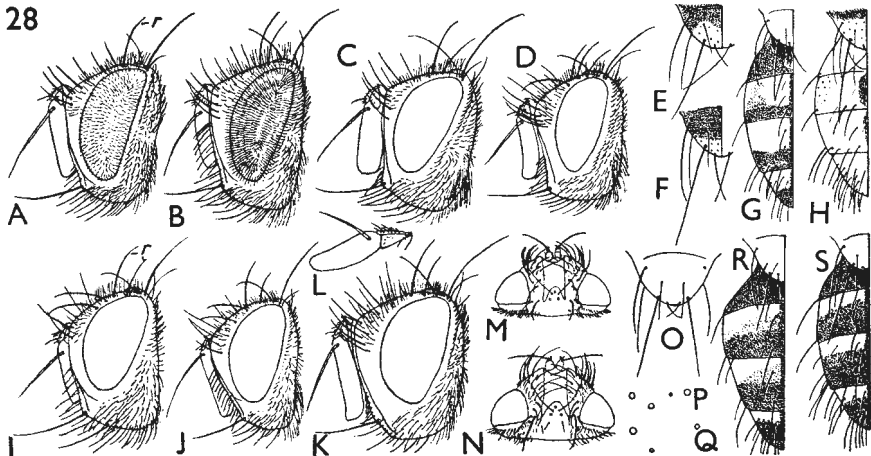


FIG. 28.

Genus *Erycia* Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (2) *Basicosta* brownish yellow. Tibiae piceous brown. Lower anterior *stpl* separated from a line imagined through the first and last by about width of its pore (fig. 28r); normally 4 *stpl*. Second and third tergites without or with weak irregular discs, second with two pairs of strong marginals (fig. 28H). Scutellum almost wholly reddish (fig. 28H). Rather densely cinereous grey dusted; parafacialia with a large shifting dark spot below frontal setae; thorax with four vittae; abdomen without or (some males) with narrow dark hind margins. ♂: figs. 28c, H, P. 7-9 mm. (= *fatua* Meigen of British authors, not Meigen according to L. Mesnil *in litt.*)
Parasite of Melitaea aurinia Rott. (!, NYMPHALIDAE) and *Arctia caja* L. (ARCTIIDAE). *Not separated so far from E. fatua, which is recorded from Melitaea athalia* Rott., *aurinia* Rott., *Nymphalis io* L. (NYMPHALIDAE), *Euproctis chryorrhoea* L., *phaeorrhoea* Don., *Lymantria monacha* L., *dispar* L. (LYMANTRIIDAE), and a foreign *Zygaena* and GEOMETRID. *Dorset.: Tadnall; Blandford*(!); *Cornwall; Wilts. e. vi-b. vii, viii, marshes, rare.*
cinerea Robineau-Desvoidy.
- 2 (1) *Basicosta* fuscous brown. Tibiae testaceous. Lower anterior *stpl* separated from a line imagined through the first and the last by more than twice width of its pore (fig. 28q); normally 3 *stpl*. Second and third tergites each with 2 pairs of discs (behind each other and somewhat irregular), second with 1 pair of marginals (fig. 27j). As a rule more than basal third of scutellum fuscous. Densely golden grey or cinereous grey dusted, thorax with vittae, abdomen without dark hind margins. Wings conspicuously yellowish at base. ♂: figs. 27D, F, J, 28Q. 6.5-8.5 mm. (= *rutila* Meigen.)
Parasite of Lymantria monacha L. (LYMANTRIIDAE) and a foreign *Hypena* (AGROTIDAE) and TORTRICID. *Perth. to Aberdeen. to Ross. Devon. to Salop to Warwks. Radnor. Channel Is. e. v-b. vi, b. vii-b. ix, rare*
ferruginea Meigen.

Genus *Masicera* Macquart, 1834.

KEY TO SPECIES.

- 1 (2) Third antennal segment hardly more than $2\frac{1}{2}$ times length of second, falling short of mouth margin by its own width. Vertex slightly over a third head-width (♂♀). ♂: third tergite at sides with a large spot of semi-decumbent, moderately short dense hairs. 10-11 mm.
Parasite of SPHINGIDAE (*Acherontia atropos* L., *Smerinthus ocellatus* L., *populi* L., *Sphinx pinastri* L., *Deilephila elpenor* L., *Celerio euphorbiae* L.), SATURNIIDAE (*S. pavonia* L., etc.) and LASIOCAMPIDAE (*Philudoria potatoria* L.). *No certain British record, except Channel Is.*
pratensis Meigen.
- 2 (1) Third antennal segment almost 3 (♀) to 4 (♂) times length of second, falling short of mouth margin by half its width (fig. 28D). Vertex almost or fully two-fifths head-width (♂♀). Very similar to *pratensis* but median thoracic vitta often indistinct, and shifting abdominal spots more conspicuous. ♂: third tergite without a spot of denser hair. ♂: figs. 27O, 28D, E. 8-13 mm.
Parasite of Lymantria dispar L., *monacha* L., *Euproctis phaeorrhoea* Don. (LYMANTRIIDAE), *Lasiocampa quercus* L., *Gastropacha quercifolia* L., etc. (LASIOCAMPIDAE), *Sphinx ligustri* L., *Dilina tiliae* L., *Celerio euphorbiae* L., *gallii* Rott., etc. (SPHINGIDAE), *Saturnia pavonia* L., etc. (SATURNIIDAE), *Cucullia verbasci* L., *Nonagra typhae* Thunb., etc. (AGROTIDAE), *Nymphalis antiopa* L.(!), *Pieris brassicae* L., also bred from "Saperda galls" (CERAMBYCIDAE), which suggests *Sciapteron tabaniforme* Rott. (SESHIDAE). *No certain record as British.*.....*silvatica* Fallén.

Genus *Paraphrocera* Brauer and Bergenstamm, 1890 (*Lydella* Robineau-Desvoidy, 1830?, *Ceromasia* auct., pars).

- 1 (2) Vertex even in female only slightly more than a third head-width (fig. 28M). Third antennal segment less than thrice length of second (fig. 28L). Disc of thorax largely glossy black, only thinly whitish-dusted, vittae hardly

visible; white dust of abdominal segments distinct only on basal third or less, except sometimes at sides (fig. 28s). ♂: vertex less than a third head-width; claws longer than last tarsal segment. ♂: fig. 28s; ♀: fig. 28L, m. 5-9 mm. (= *juvenilis* Rondani of Meade.)

Parasite of *Hadena cucubali* Schiff., *serena* Schiff., *Hydroecia micacea* Esp.(!), *Gortyna flavago* Schiff., *Coenobia rufa* Haw. (AGROTIDAE), *Abraxas grossulariata* L. (GEOMETRIDAE) and *Pyrausta nubilalis* Hb. (PYRALIDAE). *England, Wales, Scotland (to Sutherland.)*, generally distributed, *Channel Is. m. v-m. x, woods, marshes, gardens, very common. stabulans* Meigen.

- 2 (1) Vertex (fig. 28N) two-fifths head-width (♂♀). Third antennal segment of male fully (fig. 28K), of female often fully thrice as long as second. More densely whitish dusted, vittae conspicuous; whitish dust of abdomen conspicuous on basal half and exceeding it at sides and near middle (fig. 27K). ♂: claws shorter than last tarsal segment. ♂: figs. 27E, G, K, 28K, N. 5.5-10 mm. (*grisescens* auct., nec Robineau-Desvoidy? "fauve . . . còtes du second segment; . . . ailes . . . flavescentes à la base . . . ; front . . . argenté . . . brunissant", etc.).

Parasite of *Pyrausta nubilalis* Hb. (PYRALIDAE), a foreign OLETHREUTID, *Malacosoma neustria* L. (LASIOCAMPIDAE) and numerous AGROTIDS (*Arenostola elymi* Tr., a foreign Luperina, etc.). *Kent to Cornwall to Merioneth. to Lancs. to Yorks. Channel Is. (b.iv), e.v-e.ix, wastes, very common* **senilis** Meigen.

Genus *Zenillia* Robineau-Desvoidy, 1830.

KEY TO SPECIES.

- 1 (12) Mid tibia with only one strong *ad* seta (fig. 29C), sometimes a very small one basad to it. Section of *m* between *m-m* and bend as a rule almost or fully as long as apical cross-vein (fig. 29A).
 2 (5) Abdomen without distinct discs on the intermediate segments (figs. 29F, G); apical four-fifths or more of fourth tergite glossy black. 2-1-1 *stpl*.
 3 (4) Scutellum wholly black with some greyish dust at apex. First abdominal segment without marginals (fig. 29F). Base of *r*₁₊₅ with only 1 rather strong (especially on dorsal surface) seta (fig. 29A). Occiput without black setulae behind occipital row. Glossy black with thin brown (♂) or thicker grey dust (♀), female with four narrow vittae; tergites with conspicuously silver-dusted basal fifth to two-fifths and a narrow dark median vitta. ♂: frons three-tenths head-width. ♀: figs. 29A, F. 5-6.5 mm.

Parasite of *Callophrys rubi* L. (LYCAENIDAE), *Pyrausta nubilalis* Hb.

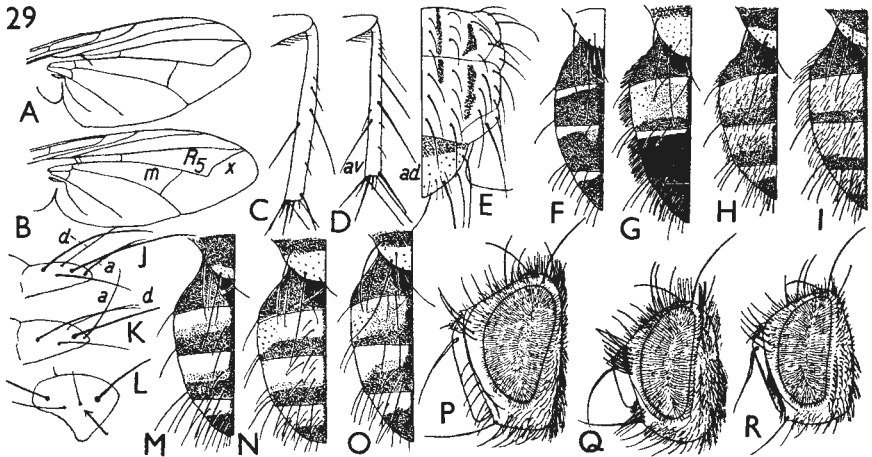


FIG. 29.

(PYRALIDAE) and a foreign OLETHREUTID. Probably generally distributed: Surrey to Cornwall to Radnor. to Warwick. Inverness. m.v-m.vii

- tritaeniata** Rondani.
- 4 (3) Scutellum reddish yellow with the base narrowly black (fig. 29G). First abdominal segment with 1-2 pairs of strong marginals. Base of r_{4+5} with 2-3 small setulae. Occiput with 1-2 rows of black setulae behind upper part of occipital row. Thinly grey dusted with four interrupted black vittae; basal two-thirds of second abdominal segment gradually more thinly silver-grey dusted, third segment of female similar, of male distinctive, glossy black with a very narrow pale-dusted basal band (broadly interrupted at middle); fourth with a little pale dust at sides of base, in male often without (fig. 29G). ♂: frons almost three-tenths head-width. ♂: figs. 29c, g. 5.5-8 mm. (Sbg. *Aplomyia* Robineau-Desvoidy.)
- Parasite of many LYCAENIDAE, also recorded from *Aporia crataegi* L. (PIERIDAE), *Malacosoma neustria* L., etc. (LASIOCAMPIDAE), and abroad a *Spilosoma* (ARCTIIDAE) and an *Eupithecia* (GEOMETRIDAE). Kent to Dorset. to Somerset to Gloucs. to Bucks. m.vi-b.ix, wastes, especially near coasts, uncommon **confinis** Fallén.
- 5 (2) Abdomen with distinct paired discs on the intermediate segments (figs. 29H, I) and a pair of marginals on the first; pale dust of fourth segment covering more than basal third (*roseanae*) to more than basal half. Base of r_{4+5} with 2-3 setulae. Occiput with a row of black setulae behind occipital row.
- 6 (7) Densely golden or brownish golden dusted, abdomen without black hind margins (but often indicated on third segment); ground-colour of scutellum wholly brownish testaceous; thoracic vittae very narrow but strongly contrasting (fig. 29E), median vitta of abdomen absent in female. Palpi orange with darker base. 2 + 1 *stpl.* Wings conspicuously orange at base. Apical scutellars at least as long as lateral ones, dorsally convex in lateral view. ♂: fig. 29E. 6-8.5 mm. (= *ciliger* Robineau-Desvoidy.)
- Parasite of most Hyponomeuta (HYPONOMEUTIDAE), of LYMANTRIIDAE (*Lymantria dispar* L., *Euproctis chrysorrhoea* L., *phaeorrhoea* Don., *Dasychira pudibunda* L., etc.), NOTODONTIDAE (*Clostera anachoreta* Schiff., *pigra* Hufn.), LASIOCAMPIDAE (*Malacosoma neustria* L.), DREPANIDAE (*D. cultraria* F.), AGROTIDAE (*Cirrhia gilvago* Schiff., *Acronicta auricoma* F., *Hadena bicirris* Hufn., a foreign *Abrostola*, etc.), GEOMETRIDAE (*Brephos notha* Hb., *Hydriomene coeruleata* F., *Bupalus piniarius* L., *Hybernia defoliaria* Ck.), ARCTIIDAE (*Arctia caja* L.), COSSIDAE (*C. cossus* L.), PYRALIDAE (*Notarcha ruralis* Scop., *Loxostege sticticalis* L., abroad *Etiella zinckenella* Tr., *Salebria*), OLETHREUTIDAE (*Cydia pomonella* L.), abroad THAUMETOPOEIDAE. Kent to Dorset. to Hereford. to Suffolk. b.v-b.vii, b.viii, m.-e.ix, uncommon **libatrix** Panzer.
- 7 (6) Dust whitish grey to cinereous grey and less dense, at least third and fourth abdominal segments always with conspicuous black hind margins; ground-colour of scutellum black on basal half or more; median vitta of abdomen well defined in both sexes in posterior view (in some *pullata* only on second segment). Palpi fuscous but apex often narrowly brownish. Wings not markedly orange outward of the bifurcation of *rs*.
- 8 (11) *stpl* 2-1 (see fig. 27o). Apical scutellars (fig. 29Ja) describing a dorsally convex curve in lateral view and not crossing discal scutellars (*d*), somewhat shorter than lateral scutellars. Pale-dusted basal band on fourth tergite (fig. 29i) occupying much more than half its length (except often in *pullata* ♀).
- 9 (10) Setulae on facial ridges ascending to slightly above middle (fig. 29P); parafrontalia wider than interfrontalia. Subapical scutellars less widely separated from each other than from basal scutellars (fig. 28F). Marginals of first tergite much finer and shorter than discs of second (fig. 29H), hair of abdomen of unequal length and decumbent (♂♀), black hind margins very narrow in male, but wide and striking in female. ♂: figs. 28F, 29P. ♀: fig. 29H. 4.8-7 mm. (*Clemelis* Robineau-Desvoidy, *Tritochaeta* Brauer and Bergenstamm.)
- Parasite of *Loxostege sticticalis* L., *Pyrausta nubilalis* Hb. (PYRALIDAE) and abroad of a PSYCHID. Soakham Down, Kent, 6.viii.38; Eynesford, Kent, 11.viii.34 (H. W. Andrews!) **pullata** Meigen.

- 10 (9) Setulae on facial ridges rarely reaching middle. Parafrontalia as a rule narrower than interfrontalia. Subapical scutellars more widely separated from each other than from basal scutellars (fig. 29I). Marginals of first tergite at least as strong as discals on second (fig. 29I), hair of abdomen erect, dense, and of even length in male; black hind margins moderately narrow (♂♀). Lower calyptra ochraceous-smoky. ♂: figs. 29I, J. 6.5-8.5 mm. (Sbg. *Myæxoristops* Townsend; *porcula* Pandellé, 1859; *acrochaeta* Brauer and Bergenstamm, 1891; according to Mesnil this species is *Phryxe blondeli* Robineau-Desvoidy, 1830.)
- Parasite of* *Pristiphora erichsoni* Htg., *Eriocampa ovata* L., and *Hemichroa crocea* Geoffr. (TENTHREDINIDAE), also recorded from *Euproctis chrysorrhoea* L. (LYMANTRIIDAE). *N. England: Cumberland; Yorks.; but also Sussex: nr. Haywards Heath, 8.vi (J. E. Collin!); Herts.: Boxmoor; Hants.: New Forest; Norfolk: Ormesby.* iv, m.v, e.vi, b.viii, woods, wastes, local.
- pexops** Brauer and Bergenstamm.
- 11 (8) *stpl* 2-1-1 (fig. 29L) or 1-1-1. Apical scutellars (a) describing a dorsally concave curve in lateral view (fig. 29K) and crossing discal scutellars; (d), subapical scutellars less widely separated from each other than from basal scutellars. Pale-dusted basal bands on tergites not or scarcely occupying half, on intermediate segments about half, the length (fig. 29M). Setulae on facial ridges ascending to middle or slightly higher (fig. 29B). Marginals of first tergite weaker than discals of second. Scutellum wholly or almost wholly black (fig. 29M). ♂: figs. 29K, L, M, R. 5-7 mm. (Sbg. *Pseudoperichaeta* Brauer and Bergenstamm; = *major* Brauer and Bergenstamm, 1891; according to Mesnil this species is *Phryxe insidiosa* Robineau-Desvoidy, 1863.)
- Parasite of* *Pyrausta nubilalis* Hb. and other PYRALIDS (*Eurrhpara hortulata* L., *Notarcha ruralis* Scop!., etc.), *Cacoecia crataegana* Hb., *podana* Scop. (!) *pronubana* Hb., *rosana* L., *Pandemis heparana* Schiff!, *Tortrix viridana* L., *Peronea schalleriana* L.! (TORTRICIDAE), *Phalonia roseana* Haw. (PHALONIIDAE), *Sarrothripus revayana* Scop. (AGROTIDAE), *Lysandra bellargus* Rott. (LYCAENIDAE) and *abroad a* *Laspeyresia* (OLETHREUTIDAE) and a HESPERIID. *England, Wales, generally distributed to Ches. and Yorks.* e.iv-e.viii, ix (*bred b. x*), woods, uncommon
- roseanae** Brauer and Bergenstamm.
- 12 (1) Mid tibia with at least two strong *ad* setae, the second one more than half as long as the strongest (fig. 29D). Section of *m* between *m-m* and bend distinctly shorter than apical cross-vein (fig. 29B). (Sbg. *Phryxe* s. lat.)
- 13 (14) Occiput without or with very few black setulae behind occipital row. Only 3 *post dc* normally (4 *post dc*: ab. *polychaeta* Macq.). Descending frontal setae very strong (fig. 29Q), forming a row which is as a rule partly double. Third and fourth tergites with numerous irregular discals (fig. 29N), third with a row of very strong marginals, which reach or exceed apex of fourth segment. Palpi pale orange. 3 *stpl*. Fuscous-black, scutellum largely pale ferruginous (fig. 29N), in male second tergite often with a reddish spot at sides. Vittae of thorax very inconspicuous; black hind margins occupying apical third or half of intermediate tergites. ♂: figs. 29B, D, N, Q. 5-9 mm. (Sbg. *Hübneria* Robineau-Desvoidy, *Aplomyia* auct., pars.)
- Parasite of many* ARCTIIDAE (*A. caja* L., *villica* L., *Pragmatobia fuliginosa* L., *abroad a* *Spilosoma*, etc.), NOCTUIDAE (*Acronicta alni* L., *tridens* Schiff., *Amathes ashworthi* Doubl., *Orthosia stabilis* Schiff., *incerta* Hufn.), LYMANTRIIDAE (*Orgyia gonostigma* F., *Dasychira pudibunda* L., *Lymantria dispar* L.), *Aglais urticae* L. (NYMPHALIDAE), *Callophrys rubi* L. (LYCAENIDAE), *Malacosoma neustria* L., etc. (LASIOCAMPIDAE), *Saturnia pavonia* L. (SATURNIIDAE), *Pachytelia villosella* Ochs. (PSYCHIDAE), and a foreign GEOMETRID. *Kent: Folkestone, 1866; Deal, 18.vi.21. affinis* Fallén.
- 14 (13) Occiput with a well-developed row of black setulae behind occipital row. 4 *post dc* (normally). Descending frontal setae forming a simple row (except in *ingens*), at the most with some much weaker setae outward to the main row (figs. 30I, J, O).
- 15 (27) Palpi fuscous.
- 16 (19) Second tergite with 2-3 pairs of subequal strong marginals (figs. 29o, 30A). Scutellum rufous on about apical two-thirds (figs. 29o, 30A); subapical

scutellars more widely separated from each other than from basal scutellars ; apical scutellars very long, almost or fully reaching *marginals* of second tergite. ♂ : fore claws longer than fifth tarsal segment.

- 17 (18) 4 *stpl* in position 2-1-1 (see fig. 29L). Apical scutellars in lateral view describing a dorsally convex curve (see fig. 29B) ; subapicals separated twice as far from each other as from subbasal scutellars. Thorax glossy black with faint vittae ; pollinosity of abdominal segments rather evenly developed on anterior half or three-fifths of intermediate and less than basal half of fourth (fig. 29o) ; second (and third) testaceous at sides. ♂ : vertex about three-tenths head-width or wider (fig. 30E). ♀ : vertex more than a third head-width. ♂ : figs. 29o, 30E. 6.5-9 mm. (Sbg. *Phebellia* Robineau-Desvoidy, 1846, pars ; *cincinna* Rondani, *concinna* auct.).

Host Mamestra persicariae L. Dorset. : Coombe Keynes, 12.vi.45 ("agnata" in coll. Wainwright.) Hants. : Farley ; Gloucs. : Cranham. Radnor. : Rhyader. m.v, m.vii-b.viii, rare.

- 18 (17) 3 *stpl* in position 2-1 (see fig. 27o). Apical scutellars in lateral view describing a dorsally concave curve (fig. 29K) ; subapical scutellars only slightly more widely separated than from subbasal scutellars. Thorax moderately densely grey dusted with rather conspicuous vittae ; anterior three-fourths or two-thirds of intermediate abdominal segments and more than anterior half of fourth rather densely whitish grey dusted (fig. 30A), pollinosity thinner on disc in posterior view and with shifting reflections, which sometimes cause the dark coloration to reach basal fifth on either side of median vitta, ground-colour wholly fuscous black. ♂ : frons up to a fourth head-width (fig. 30D). ♀ : vertex not over a third head-width. ♂ : figs. 30A, D. 6-9.5 mm. (Sbg. *Prooppia* Townsend.)

Probably not British. The Fallowfield specimen bred by A. E. Cameron from *Abraxas grossulariata* L. was identified before 1916, and the specimen is not in Manchester according to Dr. W. D. Hincks and not in the collections left by the late Dr. A. E. Cameron according to Mr. J. W. McHardy. Thanks are expressed to both Dr. Hincks and Mr. McHardy for much trouble taken in this matter. The specimen was undoubtedly misidentified.

- 19 (16) Second tergite with only 1 pair of differentiated marginals (fig. 30B). Scutellum as a rule dark on more than basal half ; apical scutellars not or only slightly exceeding *discals* of second tergite (fig. 30B). 3 *stpl* in position 2-1 (see fig. 27o).
- 20 (21) Apical scutellars in lateral view describing a dorsally convex curve (fig. 29J) ; scutellum wholly black like rest of body, abdomen with slight brassy reflections. Thorax of male rather thinly, of female moderately thickly whitish grey dusted, anteriorly with four vittae ; abdomen with thickly silver grey dusted basal bands, which gradually fade out towards or beyond middle, with shifting reflections and a poorly defined dark median vitta (fig. 30B). ♂ : claws longer than fifth tarsal segment (fig. 30C) ; frons less than three-tenths head-width. ♀ : vertex a third head-width. ♂ : figs. 24B, 30B, c. 5-7.5 mm. (Sbg. *Platymyia* Robineau-Desvoidy ; = *temera* Rondani.)

Parasite of Acronicta psi L., a foreign Eublemma (AGROTIDAE), *Semiothisa wauaria* L. (GEOMETRIDAE), *Zygaena filipendulae* L. and the sawflies *Pteronidea oligospila* Foerst., *Neurotoma saltum* L.(?), etc. Kent to Devon. to Merioneth. to Ches. to Suffolk. Co. Kerry. e. iv, e. v-b. ix, common

- 21 (20) Apical scutellars suberect, in lateral view antero-dorsally concave (fig. 30F) ; scutellum reddish at least at apex ; abdomen normally without brassy reflections. ♂♀ : claws and pulvilli not longer than fifth tarsal segment (fig. 30H) ; frons over a third head-width (fig. 30G). (Sbg. *Phryze* s. str.)
- 22 (23) Ciliation of facial ridges not ascending beyond lower fourth, and only about three frontal setae descending below antennal insertion and not or just reaching level of arista (fig. 30I), a considerable gap thus existing between them and the ascending bristles of the facial ridges. Parafrontalia with dense cinereous dust, thorax and abdomen also more densely dusted. ♂ : figs. 30F-I. 5-8 mm. (*Blepharidopsis* Brauer and Bergenstamm).

Parasite of many NOCTUIDAE, some NYMPHALIDAE (*Polygona c-album* L., *Nymphalis io* L., *Aglais urticae* L., *Vanessa atalanta* L.), PRERIDAE

(*Pieris rapae* L., *Gonepteryx rhamni* L.), LYCAENIDAE (*Thecla w-album* Knoch and *quercus* L.!), LASIOCAMPIDAE (*Malacosoma neustria* L.), LYMANTRIIDAE (*Euproctis chrysothoea* L.), THYATIRIDAE (*Thyatira batis* L.), ARCTIIDAE (*Callimorpha jacobaeae* L.), GEOMETRIDAE (*Abraxas grossulariata* L., *Hybernia defoliaria* Clk.), ZYGAENIDAE (*Z. filipendulae* L.), PYRALIDAE (*Eurrhpara hortulata* L., *Notarcha ruralis* Scop.), OECOPHORIDAE (*Depressaria putridella* Schiff., etc.) and *Forficula auricularia* L. (DERMATERA). *England, Wales, Scotland (to Sutherland), generally distributed. Co. Waterford. m.iv-e.ix, x, woods, wastes, gardens, very common.*

nemea Meigen.

23 (22) Ciliation of facial ridges ascending to middle or nearly so, 4-6 frontal setae descending to about middle of parafacialia and almost reaching their level (fig. 30J). Parafrontalia thinly grey dusted, at least posteriorly, thus appearing bluish grey. Dorsum less densely dusted. 6-9 mm.

24 (25, 26) Superior and inferior forcipes (fig. 30K) of male more than 4 times as long as wide, apical two-thirds of the superior one straight in lateral view. Slightly smaller as an average, abdomen usually without rufous coloration; scutellum dark, but slightly tipped with rufous. Dorsum less pollinose, therefore appearing somewhat darker.

Parasite especially of Zygaena (trifolii Esp., loniceræ Schev., filipendulae L.), larva leaving host in autumn, pupa hibernating in soil (always?); also parasitizing Pieris rapae L. (PIERIDAE), Thecla quercus L.(!) (LYCAENIDAE), Plusia (AGROTIDAE), Eupithecia intricata Zett. and Selenia bilunaria Esp. (GEOMETRIDAE). Surrey to Devon. to Warwks., Yorks. Aberdeen. to Ross. to Sutherland. b.iii, m-e.v, m.vi-e.viii, wastes, rather common.

longicauda Wainwright.

52 (24, 26) Superior and inferior forcipes (fig. 30L) of male of medium length, the inferior one about thrice as long as wide, more than basal half of superior forcipes convex in lateral view. As an average slightly larger, abdomen usually narrowly rufous on lateral part of base of second segment; scutellum more extensively rufous at apex. Dorsum more pollinose, therefore appearing less dark. ♂: figs. 30J, L.

Adult emerging in autumn (always?); parasite of many PIERIDAE, NYMPHALIDAE, AGROTIDAE, GEOMETRIDAE, various ARCTIIDAE, SPHINGIDAE, LYMANTRIIDAE, LASIOCAMPIDAE, a few ZYGAENIDAE, LYCAENIDAE, HESPERIIDAE, OLETHREUTIDAE, HYPONOMEUTIDAE, PYRALIDAE and abroad SATURNIIDAE and THAUMETOPOEIDAE. Also bred from the sawflies Diprion pini L. and Neodiprion sertifer Geoffr. and recorded (erroneously?) from

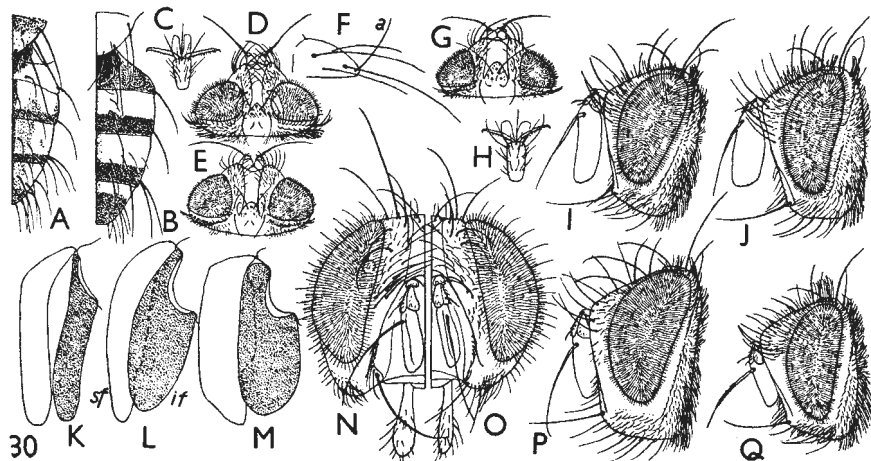


FIG. 30.

- the CERAMBYCID Pyrrhidium sanguineum L. (Some records may refer to longicauda or latilobata, the status of which is not quite certain.) England, Wales, Scotland, generally distributed. S. Ireland. b.v-m.ix, woods and wastes, very common. **vulgaris** Fallén.
- 26 (24, 25) Superior forceps of male thrice, inferior one slightly more than twice, as long as wide (fig. 30M), the former strongly convex in more than basal half (lateral view) and with a conspicuous blunt tooth on under (anterior) side. Shining black hind margins of tergites somewhat wider, that of fourth occupying almost two-thirds of the length. (= *heraclei* Meigen?)
Bred from Philudoria potatoria L. (LASIOCAMPIDAE). *Hants. to Devon. to Anglesey to Lancs. to Norfolk.* m.v-b.vi, e.vii-b.x, marshes, scarce
latilobata Wainwright.
- 27 (15) Palpi orange, at least on about apical half. 3 *stpl* in position 2-1 (see fig. 27o). Apical scutellars in lateral view dorsally convex (fig. 29J), subapical scutellars more widely separated from each other than from basal scutellars. (Sbg. *Phebellia* Robineau-Desvoidy.)
- 28 (31) Second tergite with only 1 pair of strong marginals. Parafacialia and parafacialia conspicuously golden dusted, especially in male; setulae on facial ridges approaching or reaching middle (figs. 30N, o). Anterior three-quarters or more of intermediate abdominal segments rather uniformly silver grey dusted, only slightly less densely so on disc. Bend of *m* closer to margin than to *m-m* (see fig. 31B), forming an angle of about 120°, apical cross-vein very oblique. Scutellum not very broadly reddish at apex.
- 29 (30) Palpi widely spatulate, broadened portion only about twice as long as wide, distinctly wider (measured) than narrowest part of parafacialia (fig. 30N). Frontal setae descending on to the parafacialia in a more or less irregular group (fig. 30N), parafacialia often bare below these setae. Pollinosity rather thin, the general colouring rather bluish with the markings of the thorax rather indistinct. ♂ (according to Wainwright): third antennal segment shorter than in *vicina*; *ad* row of hind tibia decidedly comb-like. ♀: fig. 30N. 10 mm.
Hosts unknown. Norfolk: Winterton, 6.vi.30 ♂; Catfield, 6.viii.33 (♀, vicina, Wainwright det.). Ross: Ardgay, 29.vii.36; Moray: Culbin Sands, 6.viii.35 (♀). Durham: Frog Hall, 27.viii.29 (♀, ingens, Villen. det.). **ingens** Brauer and Bergenstamm.
- 30 (29) Broadened portion of palpi about thrice as long as wide, not quite as wide as narrowest part of parafacialia (fig. 30o). Descending frontal setae forming a single row with some much smaller bristles to the outer side; parafacialia with some long setulose hairs below these setae (fig. 30o, P). Pollinosity and pattern slightly more conspicuous; fourth tergite more conspicuously whitish dusted on basal two-fifths, especially laterally. ♂ (according to Wainwright): third antennal segment 2.2 times as long as second; *ad* row of hind tibia less regular. ♀: figs. 30o, P. 8.5-10 mm.
Hosts unknown. Norfolk: Horning Ferry, 24.vii.35 (♀); Hants.: Farley Downs, 2.viii.32 (♀); Kent: Ham Street Woods, 7.viii.37 (♀)
- vicina** Wainwright.
- 31 (28) Second tergite with 2-3 pairs of *strong* marginals (figs. 31H, I), second to fourth with normally distinct though irregular discals. Parafacialia and parafacialia silver or very pale golden dusted, the latter bare below the descending frontal setae; setulae on facial ridges not ascending beyond lower third (figs. 30Q, 31A).
- 32 (33) Bend of *m* much nearer to hind margin than to *m-m* (distances about 1:2 or 2:3), last section before the bend almost as long as *m-m* (fig. 31B). Occiput with black setulae arranged in 2-3 irregular rows behind occipital row (fig. 30q). Rather densely and evenly grey dusted, abdomen without or with very faint shifting spots, black hind margins well defined, only occupying one-fifth to one-sixth of length of segments. Bend of *m* rather V-shaped, especially in female. ♂: genitalia, fig. 31E; inferior forceps broad and bent forward at apex. ♂: figs. 30Q, 31B, E. 8.5-9.5 mm. (= *quadriseta* VILLENEUVE).
- Hosts unknown. Hereford: Tarrington, 14.viii.97 cotei* Grilat.
- 33 (32) Bend of *m* at the most slightly nearer to hind margin than to *m-m* (distances not less than 4:5), often nearer to *m-m* than to hind margin (figs. 31c, D).

Occiput with the black setulae arranged in 1-2 irregular rows behind occipital row (fig. 31A). Blackish species with thinner, less evenly distributed grey dust, abdomen usually with conspicuous shifting spots, hind margins not very sharply defined and occupying about a third of length of segment near median vitta, the latter more conspicuous and less narrow. ♂: inferior forceps (figs. 31F, G) not bent forward at apex.

- (35) Bend of *m* forming an angle of about 100° (fig. 31C), farther from hind margin than from *m-m*, apical cross-vein rather strongly concave, often fully twice as long as the preceding section of *m*. Abdomen (fig. 31H) slightly shorter, tip of fourth segment usually triangularly pointed in female. Scutellum often largely rufous. ♂: forcipes, fig. 31F. ♂: figs. 31A, C, F. ♀: fig. 31H. 8-9.5 mm. (= *glauca* auct., nec Meigen.)

Recorded from *Acrionicta tridens* Schiff., see under *glauca*. Scotland (to Sutherland.), Wales, generally distributed. More local in England (Westmorland, Hereford., Worcs., Oxon., Norfolk, Hants.). S. Ireland. b.vi-b.ix..... *glirina* (Rondani) Pandellé.

- (34) Bend of *m* forming an angle of about 120° (fig. 31D), about as distant from hind margin as from *m-m*, apical cross-vein moderately concave and very oblique, less than twice as long as preceding section of *m*. Abdomen slightly more oblong (fig. 31I), tip of fourth segment as a rule distinctly truncate in female. Scutellum less rufous. ♂: forcipes, fig. 31G. ♂: figs. 28E, 31D, G. ♀: fig. 31I. 8-10 mm. (= *humiliceps* Pandellé.)

Less common, but until recently confused with *glirina*, the host records therefore referring to both (and probably in part other) species: *Dasychira pudibunda* L. (LYMANTRIIDAE), *Parasemia plantaginis* L., *Arctia caja* L. (ARCTIIDAE), *Acrionicta psi* L., *tridens* Schiff., *Minucia lunaris* Schiff. (*Audcent*!) (AGROTIDAE), and the sawflies *Abia sericea* L., *Cimbex femorata* L., etc. (CIMBICIDAE), *Diprion pini* L. (DIPRIONIDAE). Scotland (to Sutherland.), generally distributed. Local in England (Kent, Somerset, Gloucs., Warwks., Oxon.). e.vi-b.ix..... *glauca* Meigen.

Genus *Eumea* Robineau-Desvoidy, 1863.

KEY TO SPECIES.

- 1 (2) Palpi and scutellum wholly fuscous black. Thorax with a conspicuous linear undusted median vitta in front of suture, thus with 5 vittae anteriorly (fig. 31J). Lower calyptra with rounded inner apical angle. Hind tibia with not very dense setae on *ad* surface (fig. 31L). Setulae on facial ridges

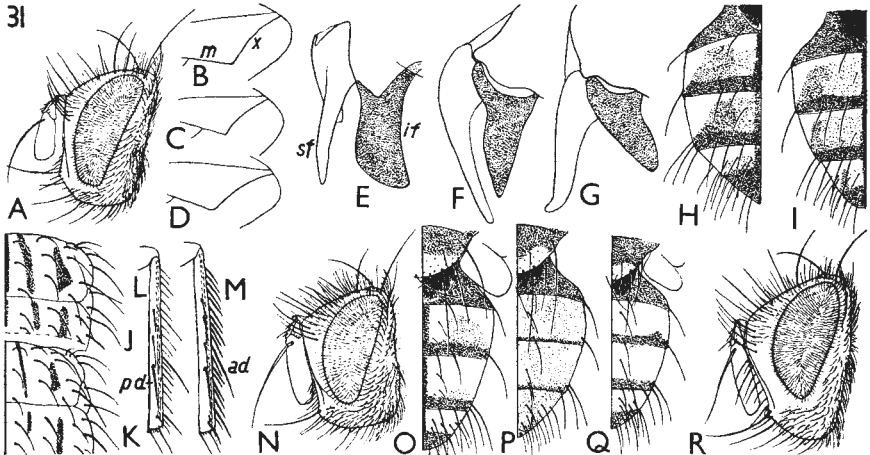


FIG. 31.

fine, hardly reaching lower third (fig. 28A). Discals of intermediate tergites distinct (fig. 28G). ♂: antennae exceeding level of lower eye margins (in anterior view), third segment 4-5 times length of second.²⁹ ♂: figs. 28A, G, 31F, L. 6.5-8.5 mm.

Parasite of Cosmia affinis L., Cucullia prenanthis Boisd. (AGROTIDAE), Eurhypara hortulata L. (PYRALIDAE) (Audcent!), Cydia pomonella L. (OLETHREUTIDAE), Cacoecia rosana L. (TORTRICIDAE) (!) and probably other Heterocera. Hants. to Cornwall to Salop to Camb. b.v-m.vi, b.vii-b.x westermanni Zetterstedt.

- 2 (1) Palpi and scutellum with reddish yellow apex. Thorax with only 4 narrow vittae anteriorly (fig. 31K), pollinosity thin, giving a bluish hue to thorax and abdomen. Lower calyptra with an inner apical angle which is almost right, only slightly obtuse (fig. 31O). Hind tibia with a dense fringe of somewhat flattened setae and a stronger seta beyond middle (fig. 31M). Setulae on facial ridges somewhat stronger, often occupying lower two-fifths (fig. 31N). Discals of intermediate tergites rather irregular, sometimes indistinct (fig. 31O). Very similar to *Pales pavida*. ♂: figs. 31K, M, N, O. 8-10.5 mm. (= *blepharipoda* Brauer and Bergenstamm; *ingens* Brauer and Bergenstamm, of Stein, nec Brauer and Bergenstamm.)

Parasite especially of Acronicta species and other AGROTIDAE (Amathes ashworthi Doubl., Mamestra brassicae L., pisi L., Orthosia stabilis Schiff., Agrotis segetum Schiff.), Pieris brassicae L. (PIERIDAE), Hyloicus pinastri L. (SPHINGIDAE), Malacosoma neustria L. (LASICAMPIDAE), Orgyia antiqua L., Euproctis phaeorrhoea Don. (LUMANTRIDAE). Kent to Devon. to Lancs. to Yorks. e.v-b.viii hortulana Meigen.

Genus **Pales** Robineau-Desvoidy, 1830 (nec Meigen, 1800, Hendel, 1908 ;
= *Ctenophorocera* Brauer and Bergenstamm, 1891 ;
= *Neopales* Coquillett, 1910).

- 1 (2) Tibiae brownish orange to light brown, somewhat darker at extremities. Lower part of parafacialia narrower (in male much) than third antennal segment (fig. 28B). *ad* row of setae of hind tibia more or less dense and regular, only 1 seta being conspicuously, and usually another slightly, longer (see fig. 31M). Black with rather thin greyish white dust and conspicuous steel blue reflections; thorax with 4 very narrow undusted vittae; abdomen almost evenly thinly dusted with very narrow undusted hind margins (fig. 31P). ♂: frons not much more than a fourth (0.27-0.28) head-width; subapical scutellars at most a third more widely separated from each other than from basal scutellars (fig. 31P). ♀: frons one-third head-width. ♂: figs. 28B, 31P. 5-10 mm. (= *cilipeda* Rondani.)

Parasite of many AGROTIDAE and LYMANTRIDAE, also attacking Vanessa io L. (!), Aglais urticae L. (NYMPHALIDAE), Arctia caja L. (ARCTIIDAE), Malacosoma neustria L., Eriogaster lanestris L., etc. (LASICAMPIDAE), Abraxas grossulariata L., Alsophila aescularia Schiff. (GEOMETRIDAE), Zygæna loniceræ Chev., filipendulae L. (ZYGÆNIDAE), Oidaematophorus lithodactylus Tr. (PTEROPHORIDAE), Peronea ferrugana Schiff., hastiana L., Tortrix viridana L., Sparganothis pilleriana Schiff. (TORTRICIDAE), Loxostege sticticalis L. (PYRALIDAE), the sawfly Tenthredo amoena Grav. (and abroad Bombyx mori L., Libythea celtis Fuess. (!), some THAUMETOPORIDAE and SATURNIIDAE). England, Wales, generally distributed. Moray. (e.iii) b v-e.x, woods and wastes, very common pavida Meigen,

²⁹ Antennae of male almost or just reaching level of lower eye margins, third segment $2\frac{1}{2}$ times length of second: *mitis* Meigen, which has often been considered identical with *westermanni*, the length of the antennal segments being subject to considerable variation in Tachinidae. *E. mitis* was wrongly recorded as British by Wainwright on the basis of a single female (St. Ives, Cornwall), now in the British Museum (Natural History). Its third antennal segment is more than thrice (3.13) the length of the second, whilst in females of *westermanni* it may be only 2.7 times that length (in *mitis* ♀ 2.5 times). The Cornwall female thus is an especially typical *westermanni*.

- 2 (1) Tibiae dark brown (beware of pale reflections). Lower part of parafacialia fully as wide as third antennal segment (fig. 31R). *ad* row of setae of hind tibia consisting of more widely spaced and more unequal setae (see fig. 31L), 3 being conspicuously longer. Black with very thin whitish dust (sometimes brownish in places), almost without bluish reflections, otherwise coloured like *pavida*. ♂: frons a third (0.32–0.33) head-width; subapical scutellars almost twice as widely separated from each other as from basal scutellars (fig. 31Q). ♀: frons slightly more than a third head-width (0.35). ♂: figs. 31Q, R. 7–9 mm.

Parasite of Plusia gamma L. (AGROTIDAE), Lymantria monacha L. (and abroad a THAUMETOPOEID and a SATURNIID). Almost certainly not British although recorded from Sussex, Cornwall, Gloucs., Hereford., etc.

pumicata Meigen.

CALLIPHORIDAE.

Like the Tachinids the Calliphoridae have a well-developed ptilinal suture (fig. 1M, *pt*), only three antennal segments with a dorsal arista (fig. 1A), a longitudinal cleft on dorso-exterior surface of second antennal segment (fig. 1A, 2), the spiracles situated in the ventral part of the tergites (fig. 1R, *sp*), and a row of hypopleural setae (fig. 1E, F, *hs*). They differ from the Tachinidae by the absence of a convex postscutellum (fig. 1E, *p*, F). This character is, however, not quite as unambiguous as it sounds or as it appears in typical forms of the families, the postscutellum being in reality only a convex fold of the metanotum, which is separated from it by a more or less deep groove, whilst it is separated from the scutellum by a membranaceous suture. In most Calliphoridae (fig. 1F) it will be seen that the uppermost part of the metanotum is slightly convex in lateral view and defined below by a slight depression. In Tachinidae, however, this depression becomes a deep groove (fig. 1E). The transitional forms are found in Rhinophorinae, a group which undoubtedly connects the two families. It is believed that the key to the families on pp. 1–2 will allow the British forms to be classified correctly.

The most common and best-known Calliphoridae are scavengers, but the habits of the various groups are very diverse, and the phylogeny of the habits in this family is an interesting and unsolved problem. The Rhinophorinae are parasites as far as known, and the larvae of most species live in woodlice. The habits of the Sarcophaginae are very varied, *Sarcophaga* itself developing in a wide range of organic matter, from excrements over dead animals to living ones. The genera most closely related to *Sarcophaga* have similar habits, many species being parasitic, some of them even in mammals. The Miltogrammini and Macronychiini all develop in nests of Sphegidae, Vespidae and Apidae, consuming the food—in many cases paralyzed insects—stored for the development of the Hymenopterous larvae and also devouring the egg or young larva of the host. *Pollenia rudis* is a parasite of earthworms, but nothing is known about other Polleniinae. In Calliphorinae the Rhiniini attack insect eggs and pupae (Patrizi!), the Cephomyiini parasitize mammals, some Calliphorini snails, others earthworms, others occasionally sheep and other mammals whilst living normally on dead organic matter, one of the Phormiini is a regular external parasite of bird nestlings, the others being scavengers. It seems that all these habits can most easily be derived from necrophagy on fresh dead bodies, but whether nature has really worked in this way remains an open question.